# **Selection Table for VAMP Protection Relays**

VTEN021B / 05.2017

### Feeder protection Machine protection Arc protection 265 M 265 (1 300M /AMP 300G **Protection and measurement** 300F /AMP 300T /AMP 230 257 259 210 255 257 120 230 255 121 221 321 VAMP 59 **AMP 57** 52 55 57 52 50 VAMP VAMP /AMP AMP /AMP VAMP AMP AMP /AMP AMP VAMP VAMP VAMP VAMP VAMP VAMP VAMP /AMP AMP VAMP ANSI IEC Symbol Protection function/measurement Type of fault Protection function/measurement Three-phase non-directional overcurrent, lo Three-phase non-directional overcurrent, low 50/51 31> vercurren set stage, definite or inverse time set stage, definite or inverse time Three-phase non-directional overcurrent, Three-phase non-directional overcurrent, i. 50/51 3|>> high-set stage, definite time igh-set stage, definite time Three-phase non-directional overcurrent, Three-phase non-directional overcurrent, 50/51 31'> high-set stage, definite or inverse time igh-set stage, definite or inverse time econdary side) econdary side) Three-phase non-directional overcurrent, Three-phase non-directional overcurrent, iigh-set stage, definite time secondary side) 50/51 3|'>> . igh-set stage, definite time (secondary si Three-phase non-directional overcurrent. Three-phase non-directional overcurrent. 50/51 3|>>> nigh-set stage, definite time high-set stage, definite time 50HS SOTF Switch on to fault Switch on to fault Three-phase directional or non dir. o/c. low Three-phase directional or non dir. o/c. low-67 or 50/51 3Ιφ> et stage, definite or inverse time et stage, definite or inverse time Three-phase directional or non dir. o/c, high-Three-phase directional or non dir. o/c, high-67 or 50/51 3Ιφ>> et stage, definite or inverse time et stage, definite or inverse time Three-phase directional or non dir. o/c, high-Three-phase directional or non dir. o/c, high-67 or 50/51 3lq>>> et stage, definite time et stage, definite time Three-phase directional or non dir. o/c, high-Three-phase directional or non dir. o/c, high-67 or 50/51 3lφ>>>> et stage, definite time et stage, definite time Distance protection, 5 zones polygonal Distance protection, 5 zones 21/21N Z< characteristic olygonal characteristic Phase segregated current differential, definite 87L Ldl> ine differential me 1) Also for tra Non-directional earth-fault, low-set stage, Non-directional earth-fault, low-set stage, • Earth-fault 50N/51N I<sub>0</sub>> ensitive, definite or inverse time ensitive, definite or inverse time Non-directional earth-fault, high-set stage, Non-directional earth-fault, • I<sub>0</sub>>> 50N/51N definite time igh-set stage, definite time Non-directional earth-fault, high-set stage, Non-directional earth-fault, • • I<sub>0</sub>>>> 50N/51N definite time igh-set stage, definite time Non-directional earth-fault, high-set stage, Non-directional earth-fault, • 50N/51N l<sub>0</sub>>>>> definite time igh-set stage, definite time Non-directional earth-fault, high-set stage, Non-directional earth-fault, . • 50N/51N I<sub>0</sub>>>>> definite time igh-set stage, definite time 67N-IEF I<sub>OT</sub> ntermittent transient earth-fault protection ntermittent transient earth-fault protection Directional or non dir. earth-fault, low-set Directional or non dir. earth-fault, low-set 67N or 50N/51N I<sub>0φ</sub>> stage, sensitive, definite or inverse time tage, sensitive, definite or inverse time Directional or non dir. earth-fault, high-set Directional or non dir. earth-fault, high-set 67N or 50N/51N $I_{0\phi} >>$ age, definite or inverse time age, definite or inverse time Directional or non dir. earth-fault, high-set Directional or non dir. earth-fault, high-set 67N or 50N/51N $I_{0\phi} >> >$ age, definite or inverse time age, definite or inverse time . . . . 59N U₀> Residual overvoltage, low-set stage Residual overvoltage, low-set stage . . . . . • . • . . . U<sub>0</sub>>> • • • 59N esidual overvoltage, high-set stage tesidual overvoltage, high-set stage 59N U<sub>0</sub>>> Residual overvoltage, high-set stage Residual overvoltage, high-set stage 50N/51N REF • Restricted high impedance earth fault Restricted high impedance earth fault . Three-phase thermal overload (motors & generators) hree-phase thermal overload (motors & 49M Τ> verload enerators) Three-phase thermal overload (feeders & cables) Three-phase thermal overload 49F Τ> eeders & cables) Three-phase thermal overload (transformers) 49T Τ> Three-phase thermal overload (transformer One-/Three-phase overvoltage, low-set One-/Three-phase overvoltage, Voltage 59 1U>/3U> 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 w-set stage age

| 59  | 1U>>>/3U>>>  | stage   | high-set stage  | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 3 | 3 | 1 | 3 3 | 3 | 3 | 3 |  | 3 | 3 |  |  |
|-----|--|---|---|---|---|---|---|---|---|---|-----|---|---|-----|---|---|---|--|---|---|--|--|
| 59  | 3U>>>>   | Three-phase overvoltage, high-set stage               |   |   | 3 |   |   |   |   |   |     |   |   |     |   |   |   |  |   |   |  |  |
| 59  | 3U>>>>>  | Three-phase overvoltage, high-set stage               |   |   | 3 |   |   |   |   |   |     |   |   |     |   |   |   |  |   |   |  |  |
| 27  | 10 30<</td <td>One-/Three-phase undervoltage, low-set stage</td> <td>One-/Three-phase undervoltage,<br/>low-set stage</td> <td>1</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3 :</td> <td>3</td> <td>1</td> <td>3 3</td> <td>3</td> <td>3</td> <td>3</td> <td></td> <td>3</td> <td>3</td> <td></td> <td></td>                     | One-/Three-phase undervoltage, low-set stage          | One-/Three-phase undervoltage,<br>low-set stage                     | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 : | 3 | 1 | 3 3 | 3 | 3 | 3 |  | 3 | 3 |  |  |
| 27  | 10/22/30/22  | One-/Three-phase undervoltage, high-set<br>stage      | One-/Three-phase undervoltage,<br>high-set stage                    | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 : | 3 | 1 | 3 3 | 3 | 3 | 3 |  | 3 | 3 |  |  |
| 27  | 1U<< 3U<<<</td <td>One-/Three-phase undervoltage,<br/>instantaneous stage</td> <td>One-/Three-phase undervoltage,<br/>instantaneous stage</td> <td>1</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3</td> <td>3 :</td> <td>3</td> <td>1</td> <td>3 3</td> <td>3</td> <td>3</td> <td>3</td> <td></td> <td>3</td> <td>3</td> <td></td> <td></td> | One-/Three-phase undervoltage,<br>instantaneous stage | One-/Three-phase undervoltage,<br>instantaneous stage               | 1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 : | 3 | 1 | 3 3 | 3 | 3 | 3 |  | 3 | 3 |  |  |
| 27  | 30/2222  | Three-phase undervoltage, instantaneous<br>stage      |   |   | 3 |   |   |   |   |   |     |   |   |     |   |   |   |  |   |   |  |  |
| 27  | 31/22222   | Three-phase undervoltage, instantaneous<br>stage      |   |   | 3 |   |   |   |   |   |     |   |   |     |   |   |   |  |   |   |  |  |
| 27P | U1<  | 1st positive sequence undervoltage stage              | 1st positive sequence undervoltage stage for generator applications |   | • |   |   |   |   |   |     | • |   | •   |   |   |   |  |   | • |  |  |
| 27P | U1<<   | 2nd positive sequence undervoltage stage              | 2nd positive sequence undervoltage stage for generator applications |   | • |   |   |   |   |   |     | • |   | -   |   |   |   |  |   | • |  |  |
| 27P | U1<<<  | 3rd positive sequence undervoltage stage              | 3rd positive sequence undervoltage stage                            |   | • |   |   |   |   |   |     |   |   |     |   |   |   |  |   |   |  |  |

3

1

3

3 3

3

3

3

3

1

3 3 3

3

3

3

3

One-/Three-phase overvoltage, high-set

ne-/Three-phase overvoltage high-set

59

1U>>/3U>>

age

One-/Three-phase overvoltage,

nigh-set stage

|                 |                   |                                     |  |  |         |      |      | eede | er pro  | otectio | n                      |          |           |           |         |                     | Mac      | hine (   | orote    | ction      |            |           |             | Arc n    | rotect   | ion       |
|-----------------|-------------------|-------------------------------------|--|--|---------|------|------|------|---------|---------|------------------------|----------|-----------|-----------|---------|---------------------|----------|----------|----------|------------|------------|-----------|-------------|----------|--|-----------|
|                 |                   |                                     |  |  |         |      |      |      |         |         |                        |          |           |           |         |                     |          |          |          |            |            |           |             |          |  |           |
|                 |                   |                                     |  |  |         |      |      |      |         |         |                        |          |           |           |         |                     |          |          |          | Ę          | V          | _         |             |          |  |           |
| Protection an   | d measureme       | ent                                 |  |  | 50      | 52   | 55   | 57   | 59      | 230     | 257                    | 259      | VAMP 300F | VAMP 300T | 22      | 57                  | 230      | 255      | 257      | VAMP 265 ( | VAMP 265 M | VAMP 300M | 2006        | 120      | 221  | 321       |
|                 |                   |                                     |  |  | VAMP 50 | VAMP | VAMP | VAMP | VAMP 59 | VAMP    | V AMP 255<br>V AMP 257 | VAMP 259 | AMP       | AMP       | VAMP 52 | VAMP 57<br>VAMP 210 | VAMP 230 | VAMP 255 | VAMP 257 | AMP        | AMP        | VAMP      | AMP         | VAMP 120 | VAMP 221                                       | VAMP 321  |
| Type of fault   | ANSI              | IEC Symbol                          | Protection function/measurement  | Protection function/measurement  |         | >    | >    | >    | >       | > .     | > >                    | >        | >         |           | 2 .     | 2 2                 |          | >        | >        | >          | >          | > >       | 2           | > >      | <u>·                                      </u> |           |
|                 | 47                | U2>, U2>>, U2>>>                    | Negative sequence overvoltage  |  |         |      | •    |      |         |         |                        |          |           |           |         |                     |          |          |          |            |            |           |             |          |  |           |
|                 | 59C               | U <sub>0</sub> >                    | Capacitor overvoltage protection   | 2nd positive sequence undervoltage stage for<br>generator applications                         |         |      |      |      |         |         |                        |          |           |           |         |                     |          |          |          |            |            |           |             |          |  |           |
| Arc protection  | 50ARC/ 50NARC     | 3 l> / l <sub>0</sub> >, L>         | Electrical arc protection stage; point sensors<br>optional, (in VAMP 321 also fiber)                                     | Electrical arc protection stage; point sensors<br>optional (in VAMP 321 also fiber)            | •       | •    |      |      | •       | • •     | • •                    | •        | •         |           | •       | •                   | •        | •        | -        | •          | •          | •         | •           |          |  | -         |
|                 | 50ARC/ 50NARC     | 3 l> / l <sub>0</sub> >, L>         | Electrical arc protection with point sensor;<br>I/O units  | Electrical arc protection with point sensor;<br>I/O units                                      |         |      |      |      |         |         |                        |          |           |           |         |                     |          |          |          |            |            |           |             | • •      | •  |           |
|                 | 50ARC/ 50NARC     | 3 l> / l <sub>0</sub> >, L>         | Electrical arc protection with fiber or current sensor I/O units   | Electrical arc protection with fiber or<br>current sensor I/O units                            |         |      |      |      |         |         |                        |          |           |           |         |                     |          |          |          |            |            |           |             |          | •  | •         |
| Other functions | 79                | $0 \rightarrow  $                   | Auto-reclosure   | Auto-reclosure   |         |      |      | •    | •       | • •     |                        |          |           |           |         | Т                   | Τ        | 1        |          |            |            |           |             |          | Τ_   | <b></b>   |
|                 | 68                |                                     | Inrush and cold load detection   | Inrush and cold load detection   | •       | •    |      |      |         |         |                        | •        | -         |           | •       | • •                 | •        | •        | •        |            |            | •         | •           |          |  |           |
|                 | 68F2              | l <sub>t2</sub> >                   | Magnetising inrush   | Magnetising inrush   | •       | •    |      | •    | •       | • •     | • •                    | •        | •         | •         | • •     | • •                 | •        | •        |          | •          | •          | •         | •           |          | $\square$                                      | $\square$ |
|                 | 46                | $ l_2 / l_1 >$                      | Current unbalance protection (in feeder mode)  | Current unbalance protection<br>(in feeder mode)   | •       | •    |      | •    | •       | • •     | • •                    | •        | •         |           |         |                     |          |          |          |            |            |           |             |          |  |           |
|                 | 46                | l <sub>2</sub> >                    | Current unbalance protection (in motor mode)   | Current unbalance protection<br>(in motor mode)  |         |      |      |      |         |         |                        |          |           | -         | •       | • •                 | •        | •        | •        | •          | •          | •         | •           |          |  |           |
|                 | 46                | ľ2>                                 | Phase unbalance protection (secondary side)  | Phase unbalance protection<br>(secondary side)   |         |      |      |      |         |         |                        |          |           | •         |         |                     |          |          |          | •          | •          |           | •           |          |  |           |
|                 | 47                | l <sub>2</sub> >>                   | Phase sequence / incorrect phase sequence<br>protection  | Phase sequence /<br>incorrect phase sequence protection  |         |      |      |      |         |         |                        |          |           |           | • •     | •                   | •        | •        | •        |            | •          | •         |             |          |  |           |
|                 | 48                |                                     | Excessive starting time  | Excessive starting time  |         |      |      |      |         |         |                        |          |           |           | •       | •                   |          | •        | -        |            | •          | •         |             |          |  |           |
|                 | 51LR              | ILr>                                | Locked rotor   | Locked rotor   |         |      |      |      |         |         | _                      |          |           |           |         | •                   |          |          |          |            |            |           |             |          | _  |           |
|                 | 37<br>86          | 31<                                 | Loss of load / under current protection  | Loss of load / under current protection  | -       | •    |      | •    |         | -       | -                      |          |           |           | _       |                     | -        | •        | -        |            | -          | _         |             |          |  |           |
|                 | 87                | 3 ∆l>                               | Latched trip<br>Three phase biased differential stage,<br>low-set stage, 2nd harmonic blocking, 5th<br>harmonic blocking | Latched trip<br>Three phase biased differential stage,<br>low-set stage, 2nd harmonic blocking |         | -    | -    |      | •       |         |                        | •        | -         | •         |         |                     | ſ        |          | -        | •          | •          |           | •           |          |  | -         |
|                 | 87                | 3 ∆l>>                              | Three phase differential stage, high-set<br>stage  | Three phase differential stage,<br>high-set stage  |         |      |      |      | •       |         |                        | •        |           | •         |         |                     |          |          |          | •          | •          |           | •           |          |  |           |
|                 | 66                |                                     | Restart inhibit  | Successive start   |         |      |      |      |         |         |                        |          |           |           | •       | •                   |          | •        |          |            |            | •         |             |          |  |           |
|                 | 64F3              | U <sub>013</sub> >                  | 100% stator earth fault protection   | 100% stator earth fault protection   |         |      |      |      |         |         |                        |          |           |           |         | •                   |          |          |          |            |            |           | •           |          |  |           |
|                 | 40                | Q<                                  | Underexcitation protection   | Underexcitation protection   |         |      |      |      |         | _       | _                      |          |           |           |         | -                   |          |          |          |            |            |           |             |          | +-   | -         |
|                 | 40                | X<, X<<<br>P<,P<<                   | Loss of excitation protection<br>One-/Three-phase reverse power and<br>underpower protection                             | Loss of excitation protection One-/Three-phase reverse power and underpower protection         |         | 1    |      | 3    |         | 3 3     | 3 3                    | 3        | 3         |           | 1 ;     | 3 3                 |          | 3        | 3        |            |            |           | 3           |          | +  |           |
|                 | 24                | U <sub>f</sub> >, U <sub>f</sub> >> | Volts / hertz overexcitation protection  | Volts / hertz overexcitation protection  |         |      | •    |      | _       | -       |                        |          |           |           | -       |                     |          |          |          |            | _          | -         |             |          | +  | -         |
|                 | 50BF              | CBFP                                | Circuit breaker failure protection   | Circuit breaker failure protection   | •       | •    | •    | •    | •       | • •     | • •                    | •        |           | •         | •       | • •                 | •        | •        | -        | •          | •          | •         | •           |          | •  | •         |
|                 | 81H/ 81L          | f ><, f >><<                        | Overfrequency and underfrequency<br>protection   | Overfrequency and underfrequency<br>protection   |         |      | •    | •    |         | • •     | • •                    | •        | •         | •         |         | • •                 | •        | •        | •        |            |            | • •       | •           |          |  |           |
|                 | 81H/ 81L          | f >>><<<                            | Overfrequency and underfrequency<br>protection   |  |         |      | -    |      |         |         |                        |          |           |           |         |                     |          |          |          |            |            |           |             |          |  |           |
|                 | 81L               | f<, f<<                             | Underfrequency protection  | Underfrequency protection  |         |      |      | •    |         | • •     | • •                    | •        |           | •         |         | • •                 | •        | •        | •        |            |            | •         | •           |          | $\bot$   |           |
|                 | 81L               | f<<<                                | Underfrequency protection  |  |         |      | •    |      |         | -+      | +                      |          |           | _         |         | +                   | _        | <u> </u> |          |            | -          |           | $\parallel$ |          | +  |           |
|                 | 81R               | df/dt                               | Rate of change of frequency (ROCOF)<br>protection  | Rate of change of frequency (ROCOF)<br>protection  |         | •    | •    | •    |         | • •     | • •                    | •        | •         | •         | •       | • •                 | •        | •        | •        |            |            | •         | •           |          | $\perp$  |           |
|                 | 21                | Z<, Z<<                             | Under-impedance protection, circle<br>characteristic   | Under-impedance protection,<br>circle characteristic   |         |      |      |      |         |         |                        |          |           |           |         | •                   |          |          |          |            |            | •         | •           |          |  |           |
|                 | 51V               | l <sub>v</sub> >                    | Voltage restrained or controlled overcurrent<br>protection   | Voltage restrained or<br>controlled overcurrent protection                                     |         |      |      | •    |         |         |                        |          |           |           | •       | •                   |          |          |          |            |            |           | •           |          |  |           |
|                 | 25                | $\Delta f,\ \Delta U,\ \Delta \phi$ | Synchrocheck   | Synchrocheck   |         |      | •    | •    |         | • •     | • •                    | •        | •         |           |         | •                   | •        | •        | •        |            | T          | •         | •           |          | $\perp$  |           |
|                 | 21FL              |                                     | Incomer short circuit fault locator, Feeder<br>fault locator   | Short circuit fault location   |         |      |      | •    |         | • •     | • •                    | •        | •         |           |         |                     |          |          |          |            |            |           |             |          |  |           |
|                 | 99                |                                     | 8 Programmable stages  | 8 Programmable stages  |         | •    |      |      |         |         | • •                    | •        | •         |           |         | • •                 |          | •        | •        | •          |            |           | •           |          | $\perp$  | •         |
|                 | 68F5              | DR<br>I <sub>f5</sub> >             | Disturbance recorder   | Disturbance recorder   |         | •    |      |      |         |         |                        | •        | •         |           |         |                     |          | •        | •        | -          | •          |           |             |          | +  | •         |
|                 | 68F5<br>50NC/51NC | l <sub>f5</sub> ><br>locap>         | Transformer overexcitation<br>Capacitor bank protection  | Transformer overexitation<br>Capacitor bank protection   | -       | •    |      | •    | -       |         | -                      |          |           | ┻╢╴       |         |                     | -        |          |          | -          | -          |           | ┻           |          | +  | $\vdash$  |
|                 | 03.10/01110       | 1000p2                              |  |  | L       | i    |      | -    |         |         | 1 -                    | 1 -      | 1         | 1[        |         |                     | 1        | 1        | 1        |            |            | 1_        | 1L          |          |  | L         |

| Type of measurement |                 |                                    |                                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  |   |  |
|---------------------|-----------------|------------------------------------|------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|---|--|
| Primary current     | 31              | Three-phase current                | Three-phase current                |   |   |   | - |   |   |   |   |   |   |   |   | • |   | • |   | • |   |   | • |  | • |  |
|                     | 3dl>            | Three-phase differential current   | Three-phase differential current   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   | • | • |   | • |  |   |  |
|                     | 3I <sub>0</sub> | Zero sequence current              | Zero sequence current              |   |   |   |   |   |   |   |   |   |   |   | • | • | • | • | • | • | • | • | • |  |   |  |
|                     | I <sub>2</sub>  | Current balance                    | Current balance                    |   |   |   |   |   |   |   |   |   |   |   |   |   | • | • | • | • | • | • | • |  |   |  |
|                     | IL              | Average and maximum demand current | Average and maximum demand current |   |   |   |   |   |   |   |   |   |   | - |   |   | • | • |   |   | • | • | • |  |   |  |
| Primary voltage     | U/3U            | one-/Three-phase and line voltages | one-/Three-phase and line voltages | 1 | 3 | 3 |   | 3 | 3 | 3 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 | 3 |   |   | 3 | 3 |  |   |  |

|                              | U <sub>0</sub>                 | Zero sequence voltage                                       | Zero sequence voltage  |   |     |   |   |   | • | • | • | •   | • | •   |     |   |   |   |   |   | • |   |  | Ī |
|------------------------------|--------------------------------|---|--|---|-----|---|---|---|---|---|---|-----|---|-----|-----|---|---|---|---|---|---|---|--|---|
|                              | U <sub>2</sub> /U <sub>1</sub> | Relative voltage unbalance                                  | Relative voltage unbalance                                     |   |     |   |   |   | • | • | • | •   | • |     |     |   |   |   |   |   | • |   |  | Ī |
| Frequency                    | f                              | System frequency  | System frequency   |   |     |   |   |   | • | • | • | •   | • | •   |     |   |   |   | • |   | • |   |  | Ī |
| Power                        | Р                              | Active power  | Active power   |   | (*) |   | • | • | • |   | • | •   |   |     |     |   |   |   |   |   |   |   |  | 1 |
|                              | Q                              | Reactive power  | Reactive power   |   | (*) |   | • | • | • |   | • | •   |   |     |     |   |   |   |   |   |   |   |  | 1 |
|                              | S                              | Apparent power  | Apparent power   |   | (*) |   | - |   | • |   | • | •   |   |     |     |   | • |   |   |   | • |   |  | 1 |
| Energy                       | E+, E-                         | Active energy   | Active energy  |   | (*) |   | • | • | • |   | • | •   |   |     |     |   |   | • |   |   |   |   |  | 1 |
|                              | Eq+, Eq-                       | Reactive energy, exported/imported                          | Reactive energy, exported/imported                             |   | (*) |   | • | • | • |   | • | •   |   |     |     |   |   | • |   |   |   |   |  | 1 |
| Power factor                 | PF                             | Power factor  | Power factor   |   | (*) |   | • | • | • |   | • | •   |   |     |     |   |   | • |   |   |   |   |  | 1 |
| Harmonics                    | I                              | 2nd to 15th and THD of phase currents                       | 2nd to 15th and THD of phase currents                          |   |     |   | • | • | • |   | • | •   |   | • • |     |   |   | • |   | • |   |   |  | 1 |
|                              | U                              | 2nd to 15th and THD of measured voltages                    | 2nd to 15th and THD of measured voltages                       |   | 1   | 3 | 3 | 3 | 3 | 3 | 3 | 3 3 |   | 1 3 | 3 3 | 3 | 3 | 3 |   |   | 3 | 3 |  | 1 |
| Voltage sags / swells        | U                              | Voltage sags / swells                                       | Voltage sags / swells  |   | 1   | 3 | 3 | 3 | 3 | 3 | 3 | 3 3 |   | 1 3 | 3 3 | 3 | 3 | 3 |   |   | 3 | 3 |  | Ī |
| Analog mA output, 1 channel  | AO                             | Any measured or calculated value, freely scalable, Optional | Any measured or calculated value,<br>freely scalable, Optional | • | •   | • |   |   |   |   |   |     |   | •   |     |   |   |   |   |   |   |   |  | Ī |
| Analog mA output, 4 channels | AO                             |   | Any measured or calculated value,<br>freely scalable, Optional |   |     |   | • | • | • |   |   |     |   |     | •   | • | • |   |   |   |   |   |  | l |

| I                             | Feeder p           | orotec   | tion     |          |          |           |           |         |         |          | Mach     | nine p   | orote    | ction       |            |           |           | Ar       | c pro    | otecti   | ion        |
|-------------------------------|--------------------|----------|----------|----------|----------|-----------|-----------|---------|---------|----------|----------|----------|----------|-------------|------------|-----------|-----------|----------|----------|----------|------------|
| VAMP 50<br>VAMP 52<br>VAMP 55 | VAMP 57<br>VAMP 59 | VAMP 230 | VAMP 255 | VAMP 257 | VAMP 259 | VAMP 300F | VAMP 300T | VAMP 52 | VAMP 57 | VAMP 210 | VAMP 230 | VAMP 255 | VAMP 257 | VAMP 265 (1 | VAMP 265 M | VAMP 300M | VAMP 300G | VAMP 120 | VAMP 121 | VAMP 221 | V A MP 321 |

Type of fault ANSI IEC Symbol Protection function/measurement Protection function/measurement Control Digital inputs Number of digital inputs, max Number of digital inputs Number of binary inputs (arc protection) Number of binary inputs (arc protection) Outputs relays Number of trip relays, max Number of trip relays Number of alarm relays Number of alarm relays Number of arc protection trip relays, Number of arc protection trip relays, < 7 ms < 7 ms Number of semicontactor outputs,

Number of semicontactor outputs, <1 ms

Number of binary outputs (arc flash protection)

Configurable

Single line diagram, 8 objects

Number of controllable objects

<1 ms

Number of binary outputs (arc flash protection)

onfigurable

Single line diagram, 8 objects

Number of controllable objects

| <br> |   |   |    |   |   |    |    |    |    |    |   |    |   |   |    |    |   |   |    |    |   |   |   |   |
|------|---|---|----|---|---|----|----|----|----|----|---|----|---|---|----|----|---|---|----|----|---|---|---|---|
| 7    | 7 | 7 | 16 | 7 | 8 | 20 | 28 | 28 | 40 | 20 | 7 | 16 | 6 | 8 | 20 | 28 | 6 | 8 | 40 | 20 |   |   |   | 6 |
|      |   |   |    |   |   |    |    |    | 3  | 3  |   |    |   |   |    |    |   |   | 3  | 3  | 1 | 1 | 3 | 3 |
| 5    | 5 | 5 | 7  | 5 | 2 | 4  | 8  | 8  | 20 | 13 | 5 | 7  | 2 | 2 | 4  | 8  | 2 | 2 | 20 | 13 |   |   |   | 4 |
| 1    | 1 | 1 | 1  | 1 | 5 | 5  | 5  | 5  | 2  | 2  | 1 | 1  | 5 | 5 | 5  | 5  | 5 | 5 | 2  | 2  | 3 |   | 2 | 1 |
|      |   |   |    |   |   |    |    |    | 4  |    |   |    |   |   |    |    |   |   | 4  |    | 2 | 1 | 4 | 4 |
|      |   |   |    |   |   |    |    |    |    |    |   |    |   |   |    |    |   |   |    |    |   |   |   | 2 |
|      |   |   |    |   |   |    |    |    | 3  |    |   |    |   |   |    |    |   |   |    |    |   | 1 | 3 | 3 |
| 8    | 8 | 8 | 8  | 8 | 8 | 8  | 8  | 8  | 8  | 8  | 8 | 8  | 8 | 8 | 8  | 8  | 8 | 8 | 8  | 8  |   |   |   | 8 |
| 6    | 6 | 6 | 6  | 6 | 6 | 6  | 6  | 6  | 6  | 6  | 6 | 6  | 6 | 6 | 6  | 6  | 6 | 6 | 6  | 6  |   |   |   | 6 |
|      | • | • |    |   |   |    |    |    |    |    |   |    |   |   |    |    |   |   |    |    |   |   |   | • |

# Condition monitoring

Interlocking and logic

Object status indication

Local and remote control

| Trip circuit   |    | TCS | Trip Circuit Supervision                  | Trip Circuit Supervision                  |            | •    |   |            |            |  |   |  |            | • | • | • | • | • | • | • | • |  |
|----------------|----|-----|---|---|------------|------|---|------------|------------|--|---|--|------------|---|---|---|---|---|---|---|---|--|
|                |    | TCS | Trip Circuit Supervision with DI for T5T8 | Trip Circuit Supervision with DI for T5T8 | <b>(</b> 2 | 2 (2 | 2 | <b>(</b> 2 | 2          |  | • |  | <b>(</b> 2 |   |   |   | • |   |   |   |   |  |
| CT Supervision |    |     | CT Supervision                            | CT Supervision                            |            | •    |   |            |            |  |   |  |            | • | • | • | • | • | • | • | • |  |
| VT Supervision | 60 |     | VT Supervision/ Fuse failure supervision  | VT Supervision/ Fuse failure supervision  |            |      |   |            |            |  |   |  |            | • | • | • | • |   |   | • | • |  |
| CB Wear        |    |     | Breaker wear                              | Breaker wear                              |            | •    |   |            | <b>(</b> 2 |  |   |  |            | • | • | • | • | • | • | • | • |  |

### Communication

| IEC 60870-5-101 TCP                  |  |   |   | • | • |   | • | • |     | - |  |   | • | • | • | • | • | • |  |   |  |
|--------------------------------------|--|---|---|---|---|---|---|---|-----|---|--|---|---|---|---|---|---|---|--|---|--|
| IEC 60870-5-101                      |  |   |   | • |   |   | • | • |     | - |  |   | • | • | • | • | • | • |  |   |  |
| IEC 60870-5-103                      |  |   |   | • |   | • | • | • | •   |   |  |   | • |   |   |   |   | • |  |   |  |
| Modbus TCP                           |  |   |   | • |   | • | • | • | •   |   |  |   | • |   |   |   |   | • |  |   |  |
| Modbus RTU                           |  |   |   | • |   | • | • | • | •   |   |  |   | • |   |   |   |   | • |  |   |  |
| Profibus DP                          |  |   |   | • |   | • | • | • | •   | - |  |   | • | • | • | • | • | • |  |   |  |
| DNP 3.0                              |  |   |   | • | • |   | • | • |     | - |  |   | • | • | • | • | • | • |  |   |  |
| DNP TCP                              |  |   |   | • | • |   | • | • |     | - |  |   | • | • | • | • | • | • |  |   |  |
| Ethernet IP                          |  |   |   | • | • |   |   | • |     |   |  |   | • | • | • | • | • | • |  |   |  |
| SPA-bus communication                |  | - |   | • |   | • | • | • | • • |   |  | - | • | • | • | • |   |   |  |   |  |
| IEC 61850                            |  |   |   | • | • |   | • | • |     | - |  |   | • | • | • | • | • | • |  |   |  |
| DeviceNet                            |  |   |   | • |   |   | • | • |     | - |  |   | • | • | • | • | • | • |  |   |  |
| TCP / IP                             |  |   |   |   | • | • | • | • | •   |   |  |   | • | • | • | • |   | • |  |   |  |
| Human-Machine-Communication, display |  |   |   |   | • | • | • | • | •   |   |  |   | • | • | • | • |   | • |  | • |  |
| Human-Machine-Communication, PC      |  |   | - |   | • |   | • | • |     |   |  |   | • | • | • | • | • | • |  |   |  |

### **General functions**

| Selfsupervision                                    |  |  |   |   |   |   |   | • |   | • | •   | • |   |   |   | • |   | • | • |   |  | • | • |
|--|--|--|---|---|---|---|---|---|---|---|-----|---|---|---|---|---|---|---|---|---|--|---|---|
| Annunciating, event generating and value recording |  |  |   |   |   |   |   | • |   | • | •   | • |   |   |   | • |   | • | • |   |  |   | • |
| Measurement and parameter display                  |  |  | • |   |   |   |   | • | • | • | • • |   |   |   |   |   | • | • | • |   |  | • | • |
| Real time clock                                    | Year, month, day, hour, minutes, seconds, milliseconds | Year, month, day, hour, minutes, seconds, milliseconds | - | • | - | • | • | • | • | • | • • | • | • | • | - |   | • | • | • | • |  |   | • |

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03

As standards, specifications and designs change from time to time, please ask for confirmation of the information given in this publication

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