# AIS series

## ANALYSER IMPEDANCE SYSTEM



*Analyser Impedance System AIS 16/3*

*The relating standards*:*
*IEC/EN 61000-3-2*
*IEC/EN 61000-3-3*
*IEC/EN 61000-3-11*
*IEC/EN 61000-3-12*
*IEC/EN 60146-1-1*
*IEC/EN 61000-2-2*
*IEC/EN 61000-4-8*
*IEC/EN 61000-4-11*
*IEC/EN 61000-4-13*
*IEC/EN 61000-4-14*
*IEC/EN 61000-4-17*
*IEC/EN 61000-4-27*
*IEC/EN 61000-4-28*
*IEC/EN 61000-4-29*
*IEC/EN 61000-4-34*
*IEC/EN 61131-2*
*IEC/EN 61496-1*
*IEC/EN 61800-3*
*IEC/EN 62040-2*
*RTCA DO-160*
*SEMI F47-0706*
*IEC TR 61547-1*
*German. Lloyd*

** The AIS series of analysers can be used for certain tests within these standards. Additional equipment might be required. For detailed information, please contact* sales@spitzenberger.de.

- ✓ AIS is a highly integrated measurement unit serving 3 functions in one device: harmonic analyser – flicker meter – reference impedance network
- ✓ Real time harmonic analyser meets IEC 61000-4-7 (2009) Ed. 2.1
- ✓ Digital flicker meter meets IEC 61000-4-15 (2010) Ed. 2.0
- ✓ Calibratable line impedance simulating network meets IEC 60725 (2012) Ed. 3.0
- ✓ Fully compliant emission measurements according to the EMC directive and the latest standards
- ✓ Automated testing with software platform “SPS TestManager” and modules for EMC standards
- ✓ Easy testing due to one-time EUT connection and automated test runs through all applicable standards
- ✓ Double FFT for simultaneous check of the source during the EUT measurement in harmonic analysis
- ✓ Simultaneous two-channel measurement for source check (flicker measurement)
- ✓ Neutral current measurement possible
- ✓ Amplifier control via webinterface and interface commands
- ✓ Test and evaluation software available

REFERENCE INSTRUMENT FOR
CE EMISSION TESTING

## AIS FUNCTIONAL PRINCIPLE

The Analyser Impedance System AIS includes the reference impedance respectively an adjustable impedance as well as voltage and current measurements with current range switching and enables harmonic and flicker measurements according to IEC 61000-3-2/ -3/ -11/ -12.
To ensure fast and reasonable operation with the test system, flicker and harmonic measurements can be performed automatically one after another with the SPS TestManager software. Thereby, the AIS switches uninterrupted between both measurement modes and between different current ranges.
For an initial overview, harmonic and flicker measurements as well as other measured values can be read directly on the AIS display.

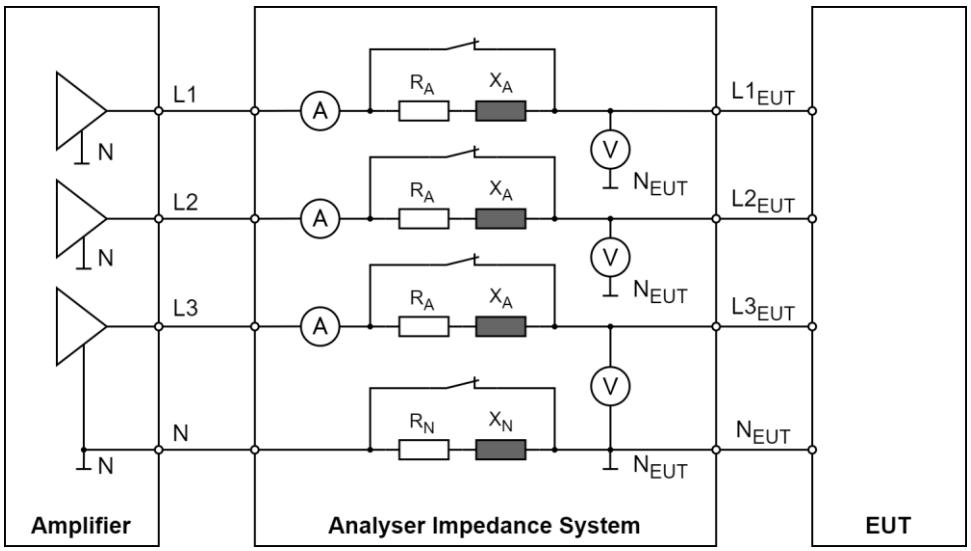



*Fig. 1: AIS principle schematic*

## TOUCHSCREEN USER INTERFACE

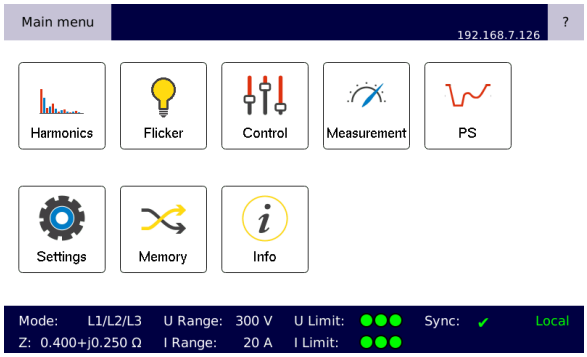



*Fig. 2: Main menu*

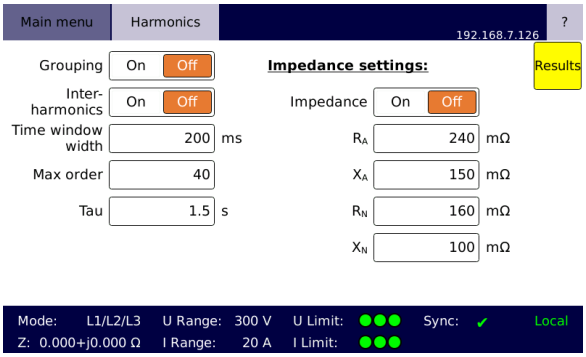



*Fig. 3: Harmonics setting*

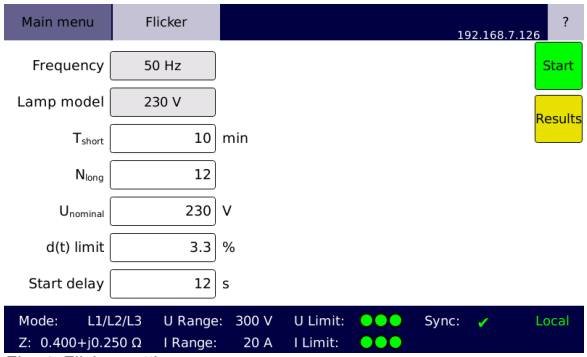



*Fig. 4: Flicker setting*

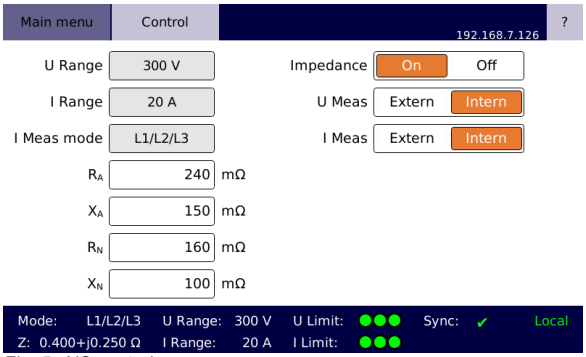



*Fig. 5: AIS control*

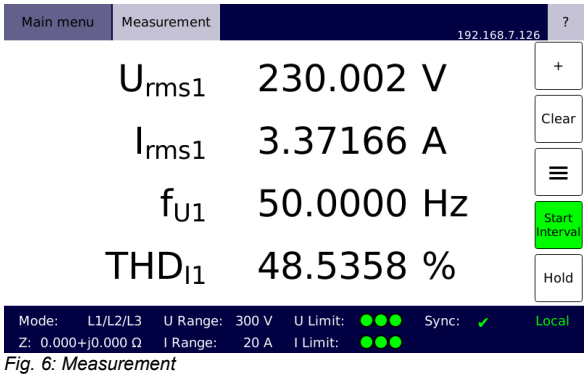



*Fig. 6: Measurement*

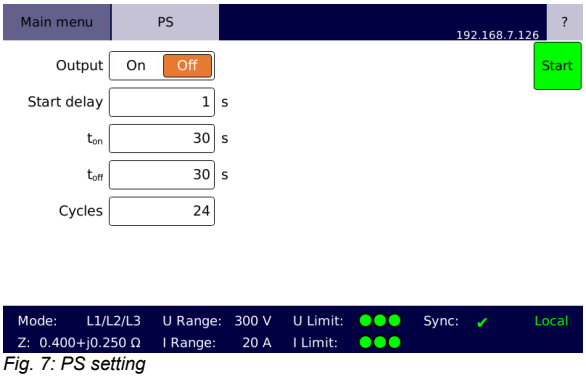



*Fig. 7: PS setting*

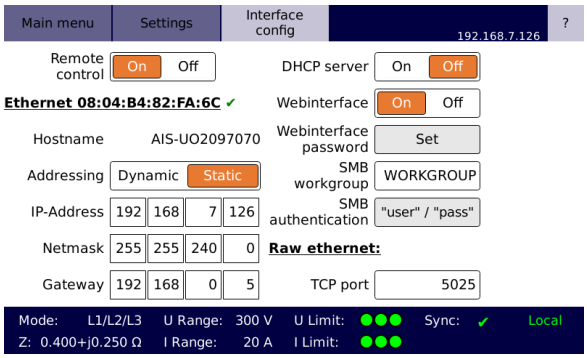



*Fig. 8: Interface config*

## SOFTWARE CONTROL

### SPS TestManager

- ✓ Test and evaluation software for fully compliant emission and immunity tests
- ✓ Automated test run of various IEC and automotive standards

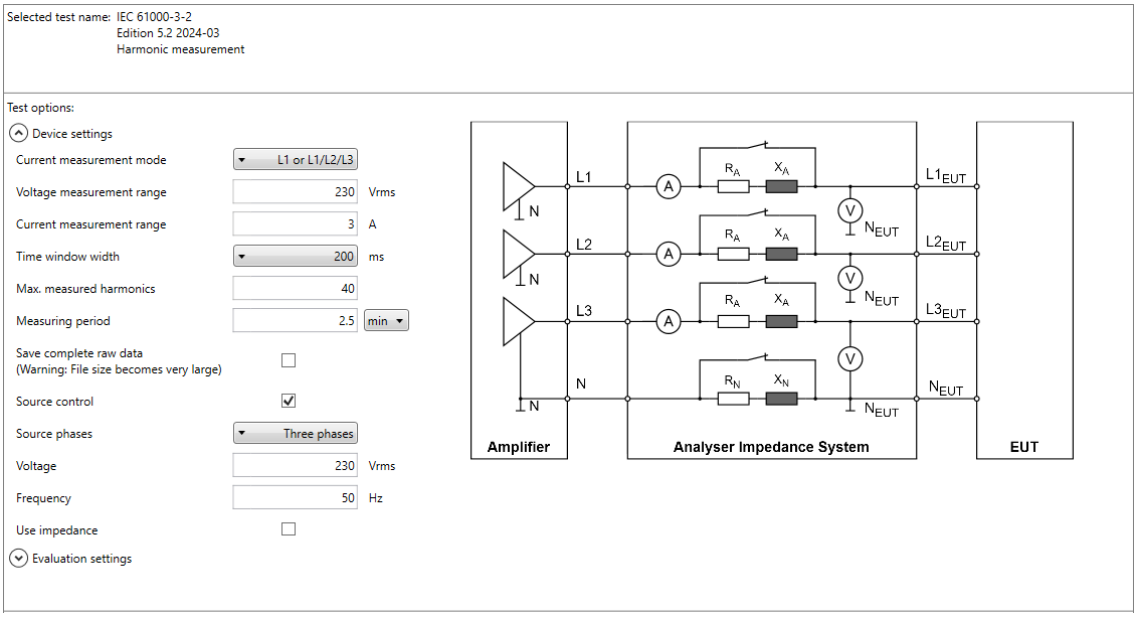



*Fig. 9: SPS TestManager software*

### Command interface

- ✓ Easily integrate the device into your own software applications
- ✓ Remote control commands are based on the SCPI standard

### Webinterface

- ✓ Monitor and control the connected device via a web browser

## Control and analysis software for harmonics and flicker

The SPS TestManager software can be used for the operation of the Analyser Impedance System AIS. It enables the control of the AIS and analyses measurement results. The tests are fully compliant for harmonics and flicker as required in IEC 61000-3-2 and -12 as well as in IEC 61000-3-3 and -11. The detailed recorded measurement data allow extended analysis for EUT evaluation purposes and provide an easy pass/fail function as well for quick analysis. For documentation purpose the report file can be exported into Excel or CSV file format.

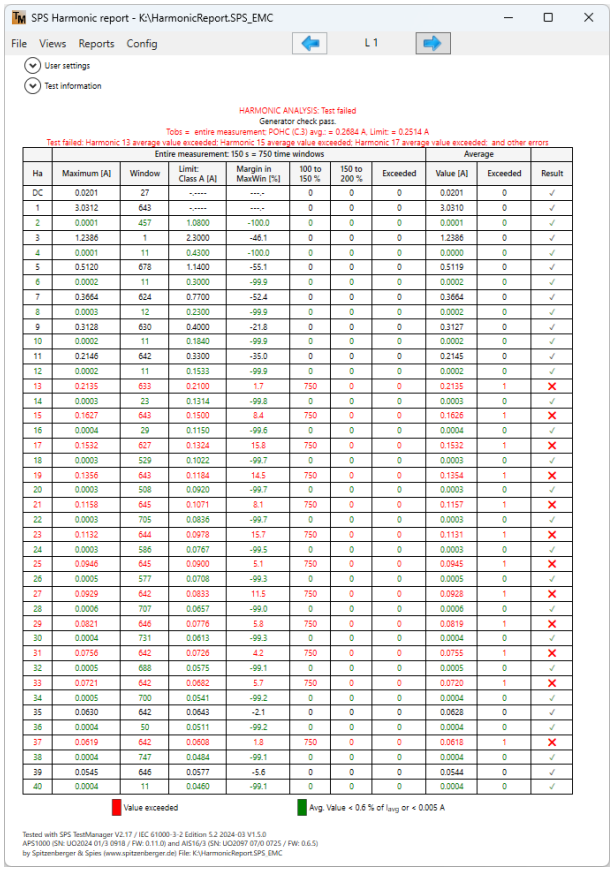



*Fig. 10: SPS Harmonic report*

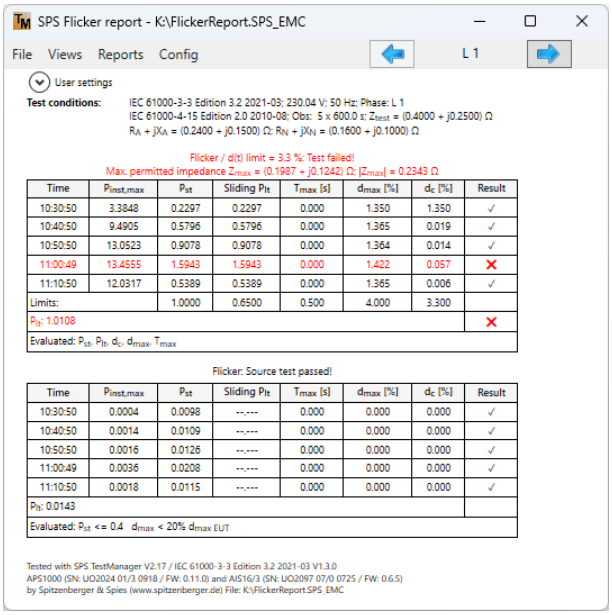



*Fig. 11: SPS Flicker report*

## Use of optional power switch PS 16/3

The optional power switch PS 16/3 supports the tester in performing tests according to Appendix B.2 of IEC 61000-3-3. The PS 16/3 is a four-pole mechanical switch that can be switched on and off using the AIS. This allows the manual switching operations to be automated.

**Expansion of internal current and voltage measurement through external inputs**

Internal current and voltage measurement can be extended using the external inputs. With the external inputs for voltage and current, the user can measure higher values or at a different location. The external measurement inputs are available as standard at every AIS. The voltage and current measurement can be selected to be either internal or external. For the external current measurement an automatic zero adjustment is available.

**Factory calibration**

The Analyser Impedance System AIS will be delivered with factory calibration certificate from Spitzenberger & Spies, which is traceable to the national measurement standards published by Physikalisch-Technische Bundesanstalt (PTB).

## TECHNICAL DATA – REAL TIME HARMONIC ANALYSER

| | | AIS series | | | |
|---|---|---|---|---|---|
| **Reference standards** | | IEC 61000-4-7 (2009) Ed. 2.1<br>IEC 61000-3-2 (2018) Ed. 5.0, (2020) Ed. 5.1, (2024) Ed. 5.2<br>IEC 61000-3-12 (2011) Ed. 2.0, (2021) Ed. 2.1 | | | |
| **Accuracy** | | class I acc. to IEC 61000-4-7 Ed. 2.1 | | | |
| **Frequency range fundamental** | | 10 Hz … 1 kHz | | | |
| **Frequency range harmonics** | | up to 10 kHz | | | |
| **Current measurement accuracy** *(DC ... 3 kHz)* | | ±0.5 % of measured value ±0.04 % of measurement range value | | | |
| **Voltage drop of current measurement** *(RMS)* | | < 0.15 V | | | |
| **Voltage measurement ranges** | *nominal voltage (RMS)* | 150 V | 300 V | 600 V | 1000 V |
| | *peak voltage* | 225 V | 450 V | 900 V | 1800 V |
| **Voltage measurement accuracy** *(DC ... 3 kHz)* | | ±0.1 % of measured value ±0.004 % of measurement range value | | | |
| **Input impedance** *(voltage meas.)* | | > 1 MΩ | | | |
| **Power measurement accuracy** *(45 … 65 Hz, power factor > 0.7)* | | ±0.2 % of reading ±0.01 % of range<br>range = voltage measurement range (nominal voltage) * current measurement range (nominal current) | | | |
| **Acquired values** | | voltage, current, power and frequency values (acquired over 100 ms):<br>$U_{rms}$, $U_{AC}$, $U_{DC}$, $U_{min}$, $U_{max}$, $I_{rms}$, $I_{AC}$, $I_{DC}$, $I_{min}$, $I_{max}$, P, S, Q, PF, $f_U$, $f_I$<br>source voltage measurement: $Us_{rms}$, $Us_{AC}$, $Us_{DC}$, $Us_{min}$, $Us_{max}$<br>harmonic analysis values according to IEC 61000-4-7 Ed. 2.1 (acquired over adjusted width of time window):<br>$U_{hrms}$, $U_{hAC}$, $I_{hrms}$, $I_{hAC}$, $S_h$, $S_{hAC}$, $P_h$, $P_{hAC}$, $P_f$, $\lambda_{AC}$, cos φ,<br>$THD_U$, $THD_I$, THV, THC, POHV, POHC, $PWHD_{H_U}$, $PWHD_{H_I}$, PWHV, PWHC, $THDG_U$, $THDG_I$, THVG, THCG, $POHV_g$, $POHC_g$, $PWHD_{g_U}$, $PWHD_{g_I}$, $PWHV_g$, $PWHC_g$, $THDS_U$, $THDS_I$, THVS, THCS, $POHV_{sg}$, $POHC_{sg}$, $PWHD_{sg_U}$, $PWHD_{sg_I}$, $PWHV_{sg}$, $PWHC_{sg}$ | | | |
| **Width of time window** | | 1 ms … 1000 ms (synchronised to fundamental) | | | |
| **Anti-aliasing filter** | | > 50 dB | | | |
| **Smoothing filter** | | digital low-pass filter 1st order (adjustable; preset: τ = 1.5 s) | | | |
| **Grouping** | | simultaneous measurement of ungrouped and grouped values acc. to IEC 61000-4-7 Ed. 2.1 | | | |
| **Interharmonics** | | optional results for interharmonics | | | |
| **200 Hz band** | | optional results for 200 Hz band | | | |
| **Operating mode** | | continuous measurement with real time data transfer | | | |
| **Memory** | | FIFO for 10 min | | | |
| **Offset adjustment** | | automatically | | | |

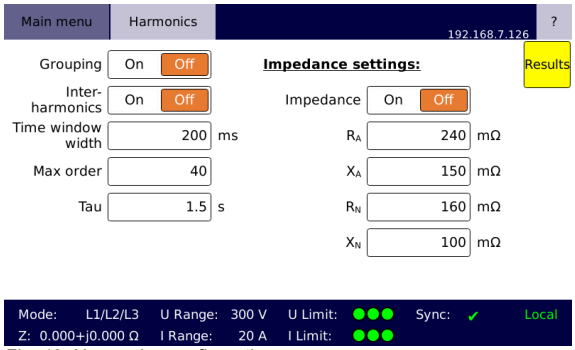



*Fig. 12: Harmonics configuration*

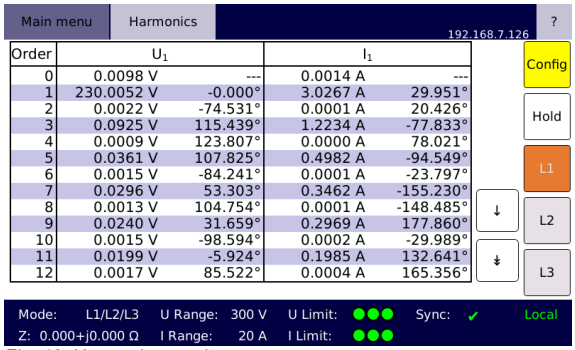



*Fig. 13: Harmonics results*

## TECHNICAL DATA – FLICKERMETER

| | AIS series |
|---|---|
| **Reference standards** | IEC 61000-4-15 (2010) Ed. 2.0<br>IEC 61000-3-3 (2017) Ed. 3.1, (2021) Ed. 3.2<br>IEC 61000-3-11 (2017) Ed. 2.0 |
| **Measurement inputs** | 2 (EUT/source) per phase |
| **Frequency range** | 50 Hz / 60 Hz |
| **Input impedance** | > 1 MΩ |
| **Flicker measurement values** | $P_{inst,max}$, $P_{st}$, $P_{lt}$ |
| **Accuracy** | flickermeter class F1 acc. to IEC 61000-4-15 Ed. 2.0 |
| **Flicker classification** | logarithmic |
| **Working range of the classifier** | 0.1 ≤ k ≤ 10 |
| **d(t) measurement values** | $d_c$, $d_{max}$, $T_{max}$ (adjustable threshold) |
| **Additional acquired values** | voltage and current values (acquired over half-period):<br>$U_{hp_max}$, $U_{hp_min}$, $I_{hp_max}$, $I_{hp_min}$<br>source measurement: $Us_{hp_max}$, $Us_{hp_min}$ |
| **Measurement duration** | 1 s … 24 h |

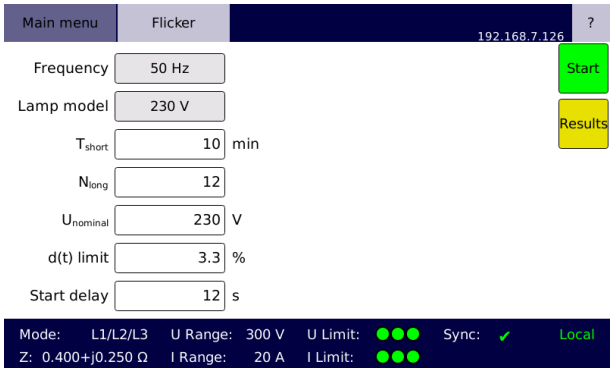



*Fig. 14: Flicker configuration*

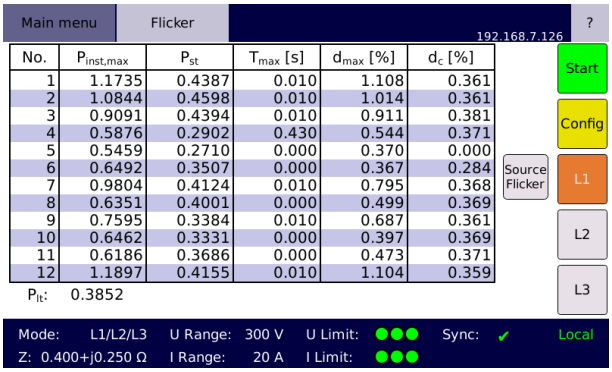



*Fig. 15: Flicker results*

## TECHNICAL DATA – GENERAL

| | | |
|---|---|---|
| **Display** | | 7.0" touchscreen (17.8 cm, resolution 800 x 480) |
| **User interface** | | touchscreen / incremental encoder / webinterface |
| **Interface** | | Ethernet 100 Mbit/s (HiSLIP SCPI)<br>USB 2.0 Host |
| **Resolution measurement input** | | 20 bit SAR A/D converter (per channel) |
| **Peak input voltage** *(max.)* | | 1000 V |
| **Impedance accuracy** | | Z = R + jX: 4 % at X / R ratio 0.5 ... 0.75<br>acc. to IEC 61000-3-11 Ed. 2.0 |
| **Number of external voltage measurement channels** | | 1 (for single phase AIS)<br>3 (for three phase AIS) |
| **Number of external current measurement channels** | | 1 (for single phase AIS)<br>3 (for three phase AIS) |
| **Ext. measurement inputs** *(max.)* | *Peak voltage* | 1000 V |
| | *Peak current* | 200 mA |
| **Protection circuits** | | overcurrent (circuit breaker plus electronic protection)<br>overtemperature (electronic protection) |
| **Calibration cycle** | | 1 year (recommended) |
| **Power supply** *(±10 %, 50/60 Hz)* | | 230 V |
| **Ambient temperature** | | +10 °C up to +40 °C |
| **Ambient temperature for measurement accuracy values** | | +23 °C ± 5 °C |
| **Storage temperature** | | -25 °C up to +60 °C |
| **Relative humidity** | | non condensing, max. 80 % for temperature < 31 °C,<br>decreasing linearly to 50 % at 40 °C |
| **Ingress protection** | | IP20 |

## THE AIS TYPE GLOSSARY

| **AIS** | **75** | **/3** | **/P** | **/JK** |
|---|---|---|---|---|

***Analyser Impedance System***

***Nominal current (A)***
*16/32/75/125/250/375/500/750*

***Number of phases***
*/1 = single phase*
*/3 = three phase*

***Impedance values are programmable***
*/M = manual*
*/P = pneumatic or motorised (type depending)*
*left out = no*

***Additional Japanese/Korean reference impedance***
*/JK = built-in*
*left out = not built-in*

For measurements with nominal currents above 750 A two analyser impedance systems can be connected in parallel, for example two AIS 500/3/P for 1000 A or two AIS 750/3/P for 1500 A.

## TECHNICAL DATA – AIS series

| | | AIS 16/1, AIS 16/3 | | | |
|---|---|---|---|---|---|
| **Continuous current** *(max., RMS)* | | 16 A | | | |
| **Short-time current** *(max., RMS)* | | 32 A | | | |
| **Current measurement ranges** | *Nominal current (RMS)* | 0.16 A | 0.75 A | 3 A | 20 A |
| | *Peak current* | 0.78 A | 3.125 A | 12.5 A | 50 A |
| **Internal impedance** | | IEC / EN standards | | | |
| | *Phase conductor* | $R_A$: 240 mΩ | | | |
| | | $X_A$: 150 mΩ at 50 Hz | ($X_A$: 180 mΩ at 60 Hz) | | |
| | *Neutral conductor* | $R_N$: 160 mΩ | | | |
| | | $X_N$: 100 mΩ at 50 Hz | ($X_N$: 120 mΩ at 60 Hz) | | |
| | *Max. phase-neutral impedance* | R: 400 mΩ | | | |
| | | X: 250 mΩ at 50 Hz | (X: 300 mΩ at 60 Hz) | | |
| **Impedance adjustment** | | fixed | | | |
| **Cooling** | | temperature-controlled forced air cooling | | | |
| **Power supply** *(±10 %, 50/60 Hz)* | | 230 V | | | |
| **Line protection, connection** | | 2 A, Schuko | | | |
| **Housing** | | plug-in unit or rack, light grey (RAL 7035) | | | |
| | *Analyser approx. dimensions (H x W x D)* | 19", 4 U<br>178 x 483 x 600 mm | | | |
| **Weight** | *AIS 16/1 (approx.)*<br>*AIS 16/3 (approx.)* | 22 kg<br>27 kg | | | |

## Internal impedance wiring AIS 16/1, AIS 16/3

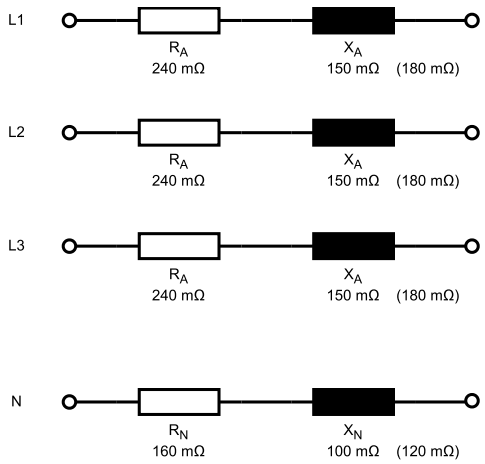



*Fig. 16: IEC / EN standard reference impedance 50 Hz (60 Hz) values for AIS 16/1 (L1, N) and AIS 16/3 (L1, L2, L3, N)*

## TECHNICAL DATA – AIS series

| | | AIS 32/1, AIS 32/3 | | | | |
|---|---|---|---|---|---|---|
| **Continuous current** *(max., RMS)* | | 32 A | | | | |
| **Short-time current** *(max., RMS)* | | 64 A | | | | |
| **Current measurement ranges** | *Nominal current (RMS)* | 0.16 A | 0.64 A | 2.5 A | 16 A | 75 A |
| | *Peak current* | 0.78 A | 3.125 A | 12.5 A | 50 A | 200 A |
| **Internal impedance** | | IEC / EN standards | | | | |
| | *Phase conductor* | $R_A$: 150 mΩ or 240 mΩ | | | | |
| | | $X_A$: 150 mΩ at 50 Hz | | ($X_A$: 180 mΩ at 60 Hz) | | |
| | *Neutral conductor* | $R_N$: 100 mΩ or 160 mΩ | | | | |
| | | $X_N$: 100 mΩ at 50 Hz | | ($X_N$: 120 mΩ at 60 Hz) | | |
| | *Phase-neutral impedance* | R: 250 mΩ or 400 mΩ | | | | |
| | | X: 250 mΩ at 50 Hz | | (X: 300 mΩ at 60 Hz) | | |
| | *Max. continuous impedance voltage drop (RMS)* | 30 V | | | | |
| | *Max. short-term impedance voltage drop (RMS)* | 45 V | | | | |
| **Impedance adjustment** | | automatic bridging | | | | |
| **Cooling** | | temperature-controlled forced air cooling | | | | |
| **Power supply** *(±10 %, 50/60 Hz)* | | 230 V | | | | |
| **Line protection, connection** | | 2 A, Schuko | | | | |
| **Housing** | | plug-in unit or rack, light grey (RAL 7035) | | | | |
| | *Analyser approx. dimensions (H x W x D)* | 19", 9 U<br>400 x 483 x 600 mm | | | | |
| **Weight** | *AIS 32/1 (approx.)*<br>*AIS 32/3 (approx.)* | 55 kg<br>62 kg | | | | |

## Internal impedance wiring AIS 32/1, AIS 32/3

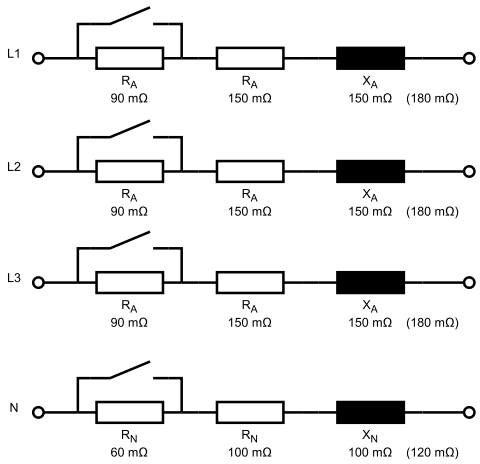



*Fig. 17: IEC / EN standard reference impedance 50 Hz (60 Hz) values for AIS 32/1 (L1, N) and AIS 32/3 (L1, L2, L3, N)*

## TECHNICAL DATA – AIS series

| | | AIS 75/1, AIS 75/3 | | | | |
|---|---|---|---|---|---|---|
| **Continuous current** *(max., RMS)* | | 75 A | | | | |
| **Short-time current** *(max., RMS)* | | 126 A | | | | |
| **Current measurement ranges** | *Nominal current (RMS)* | 0.16 A | 0.64 A | 2.5 A | 16 A | 75 A |
| | *Peak current* | 0.78 A | 3.125 A | 12.5 A | 50 A | 200 A |
| **Internal impedance** | | IEC / EN standards | | | | |
| | *Phase conductor* | $R_A$: 150 mΩ or 240 mΩ | | | | |
| | | $X_A$: 150 mΩ at 50 Hz | | ($X_A$: 180 mΩ at 60 Hz) | | |
| | *Neutral conductor* | $R_N$: 100 mΩ or 160 mΩ | | | | |
| | | $X_N$: 100 mΩ at 50 Hz | | ($X_N$: 120 mΩ at 60 Hz) | | |
| | *Phase-neutral impedance* | R: 250 mΩ or 400 mΩ | | | | |
| | | X: 250 mΩ at 50 Hz | | (X: 300 mΩ at 60 Hz) | | |
| | *Max. continuous impedance voltage drop (RMS)* | 30 V | | | | |
| | *Max. short-term impedance voltage drop (RMS)* | 45 V | | | | |
| **Impedance adjustment** | | automatic bridging | | | | |
| **Cooling** | | temperature-controlled forced air cooling | | | | |
| **Power supply** *(±10 %, 50/60 Hz)* | | 230 V | | | | |
| **Line protection, connection** | | 2 A, Schuko | | | | |
| **Housing** | | plug-in unit or rack, light grey (RAL 7035) | | | | |
| | *Analyser approx. dimensions (H x W x D)* | 19", 15 U<br>667 x 483 x 600 mm | | | | |
| **Weight** | *AIS 75/1 (approx.)*<br>*AIS 75/3 (approx.)* | 120 kg<br>150 kg | | | | |

## Internal impedance wiring AIS 75/1, AIS 75/3

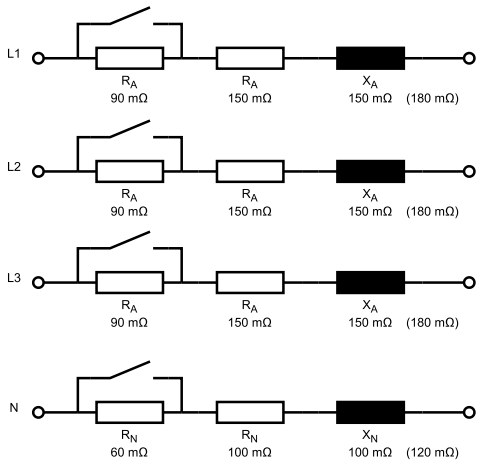



*Fig. 18: IEC / EN standard reference impedance 50 Hz (60 Hz) values for AIS 75/1 (L1, N) and AIS 75/3 (L1, L2, L3, N)*

## TECHNICAL DATA – AIS series

| | | AIS 32/3/M, AIS 32/3/P | | AIS 75/3/M, AIS 75/3/P | | |
|---|---|---|---|---|---|---|
| **Continuous current** *(max., RMS)* | | 32 A | | 75 A | | |
| **Short-time current** *(max., RMS)* | | 64 A | | 126 A | | |
| **Current measurement ranges** | *Nominal current (RMS)* | 0.16 A | 0.64 A | 2.5 A | 16 A | 75 A |
| | *Peak current* | 0.78 A | 3.125 A | 12.5 A | 50 A | 200 A |
| **Internal impedance** | | IEC / EN standards | | | | |
| | *Phase conductor* | $R_A$: 15 mΩ ... 240 mΩ | | in 15 mΩ steps | | |
| | | $X_A$: 9.38 mΩ ... 150 mΩ | | in 9.38 mΩ steps at 50 Hz | | |
| | | $X_A$: 11.26 mΩ ... 180 mΩ | | in 11.26 mΩ steps at 60 Hz | | |
| | *Neutral conductor* | $R_N$: 10 mΩ ... 160 mΩ | | in 10 mΩ steps | | |
| | | $X_N$: 6.25 mΩ ... 100 mΩ | | in 6.25 mΩ steps at 50 Hz | | |
| | | $X_N$: 7.5 mΩ ... 120 mΩ | | in 7.5 mΩ steps at 60 Hz | | |
| | *Max. phase-neutral impedance* | R: 400 mΩ | | | | |
| | | X: 250 mΩ at 50 Hz | | (X: 300 mΩ at 60 Hz) | | |
| | *Max. continuous impedance voltage drop (RMS)* | 30 V | | | | |
| | *Max. short-term impedance voltage drop (RMS)* | 45 V | | | | |
| **Impedance adjustment** | | software assisted manual bridging (M types)<br>automatic bridging (P types) | | | | |
| **Cooling** | | temperature-controlled forced air cooling | | | | |
| **Power supply** *(±10 %, 50/60 Hz)* | | 230 V | | | | |
| **Line protection, connection** | | M type: 2 A, Schuko<br>P type: 4 A, Schuko | | | | |
| **Housing** | | plug-in unit or rack, light grey (RAL 7035) | | | | |
| | *Analyser approx. dimensions (H x W x D)* | 19", 15 U<br>M type: 667 x 483 x 600 mm<br>P type: 667 x 483 x 650 mm | | | | |
| **Weight** | *approx.* | 150 kg | | 175 kg | | |

## Internal impedance wiring AIS 32/3/M, AIS 32/3/P, AIS 75/3/M, AIS 75/3/P

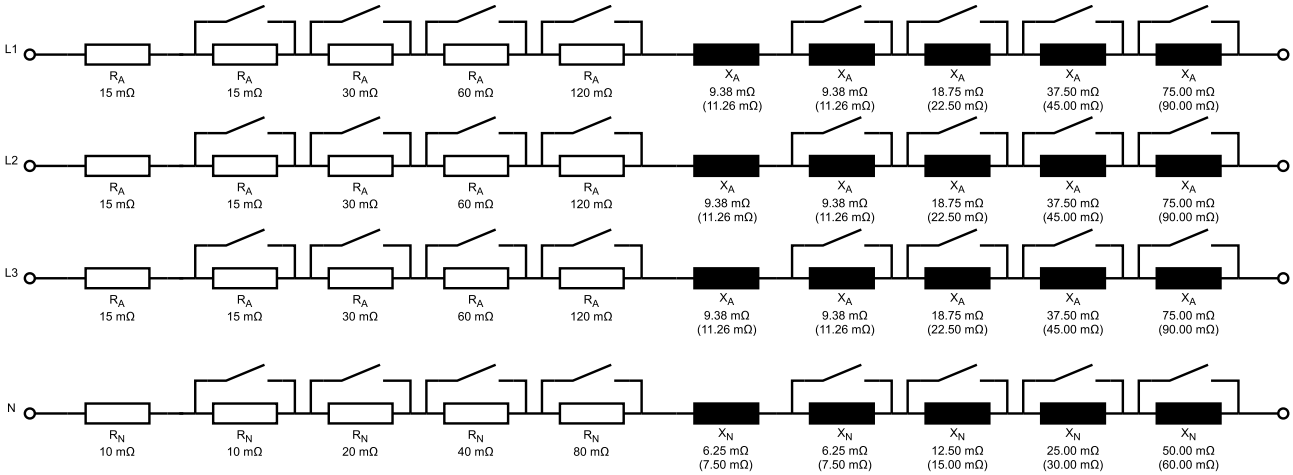



*Fig. 19: IEC / EN standard reference impedance 50 Hz (60 Hz) values for AIS 32/3/M, AIS 32/3/P, AIS 75/3/M, AIS 75/3/P (L1, L2, L3, N)*

## TECHNICAL DATA – AIS series

| | | AIS 125/3/P | | | | | |
|---|---|---|---|---|---|---|---|
| **Continuous current** *(max., RMS)* | | 125 A | | | | | |
| **Short-time current** *(max., RMS)* | | 250 A | | | | | |
| **Current measurement ranges** | *Nominal current (RMS)* | 0.16 A | 0.64 A | 2.5 A | 16 A | 75 A | 125 A |
| | *Peak current* | 0.78 A | 3.125 A | 12.5 A | 50 A | 200 A | 400 A |
| **Internal impedance** | | IEC / EN standards | | | | | |
| | *Phase conductor* | $R_A$: 7.5 mΩ ... 240 mΩ | | | in 7.5 mΩ steps | | |
| | | $X_A$: 4.69 mΩ ... 150 mΩ | | | in 4.69 mΩ steps at 50 Hz | | |
| | | $X_A$: 5.63 mΩ ... 180 mΩ | | | in 5.63 mΩ steps at 60 Hz | | |
| | *Neutral conductor* | $R_N$: 5 mΩ ... 160 mΩ | | | in 5 mΩ steps | | |
| | | $X_N$: 3.13 mΩ ... 100 mΩ | | | in 3.13 mΩ steps at 50 Hz | | |
| | | $X_N$: 3.75 mΩ ... 120 mΩ | | | in 3.75 mΩ steps at 60 Hz | | |
| | *Max. phase-neutral impedance* | R: 400 mΩ | | | | | |
| | | X: 250 mΩ at 50 Hz | | | (X: 300 mΩ at 60 Hz) | | |
| | *Additional impedance inaccuracy* | 1 mΩ | | | | | |
| | *Max. continuous impedance voltage drop (RMS)* | 30 V | | | | | |
| | *Max. short-term impedance voltage drop (RMS)* | 45 V | | | | | |
| **Compressed air supply** | | pressure: 5 … 10 bar, connector ¼" NW 7.2 | | | | | |
| **Impedance adjustment** | | automatic, pneumatic bridging | | | | | |
| **Cooling** | | temperature-controlled forced air cooling | | | | | |
| **Power supply** *(±10 %, 50/60 Hz)* | | 230 V | | | | | |
| **Line protection, connection** | | 4 A, Schuko | | | | | |
| **Housing** | | rack, light grey (RAL 7035) | | | | | |
| | *Analyser approx. dimensions (H x W x D)* | 19", 37 U<br>1920 x 600 x 1050 mm | | | | | |
| **Weight** | *approx.* | 750 kg | | | | | |

## Internal impedance wiring AIS 125/3/P

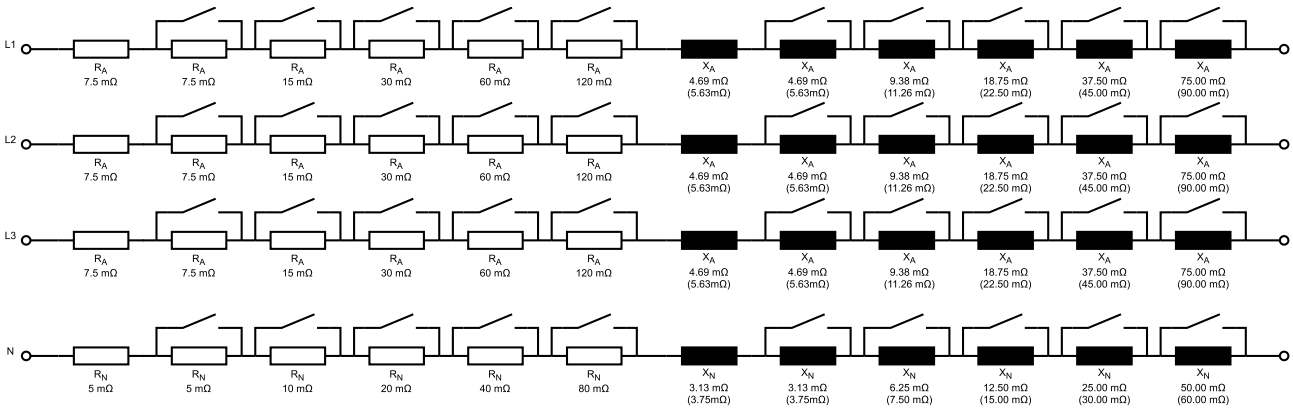



*Fig. 20: IEC / EN standard reference impedance 50 Hz (60 Hz) values for AIS 125/3/P (L1, L2, L3, N)*

## TECHNICAL DATA – AIS series

| | | AIS 250/3/P | | | | | |
|---|---|---|---|---|---|---|---|
| **Continuous current** *(max., RMS)* | | 250 A | | | | | |
| **Short-time current** *(max., RMS)* | | 500 A | | | | | |
| **Current measurement ranges** | *Nominal current (RMS)* | 0.16 A | 0.64 A | 2.5 A | 16 A | 75 A | 300 A |
| | *Peak current* | 0.78 A | 3.125 A | 12.5 A | 50 A | 200 A | 800 A |
| **Internal impedance** | | IEC / EN standards | | | | | |
| | *Phase conductor* | $R_A$: 3.75 mΩ ... 240 mΩ | in 3.75 mΩ steps | | | | |
| | | $X_A$: 2.34 mΩ ... 150 mΩ | in 2.34 mΩ steps at 50 Hz | | | | |
| | | $X_A$: 2.81 mΩ ... 180 mΩ | in 2.81 mΩ steps at 60 Hz | | | | |
| | *Neutral conductor* | $R_N$: 2.5 mΩ ... 160 mΩ | in 2.5 mΩ steps | | | | |
| | | $X_N$: 1.56 mΩ ... 100 mΩ | in 1.56 mΩ steps at 50 Hz | | | | |
| | | $X_N$: 1.88 mΩ ... 120 mΩ | in 1.88 mΩ steps at 60 Hz | | | | |
| | *Max. phase-neutral impedance* | R: 400 mΩ | | | | | |
| | | X: 250 mΩ at 50 Hz | (X: 300 mΩ at 60 Hz) | | | | |
| | *Additional impedance inaccuracy* | 1 mΩ | | | | | |
| | *Max. continuous impedance voltage drop (RMS)* | 30 V | | | | | |
| | *Max. short term impedance voltage drop (RMS)* | 45 V | | | | | |
| **Compressed air supply** | | pressure: 5 … 10 bar, connector ¼" NW 7.2 | | | | | |
| **Impedance adjustment** | | automatic pneumatic bridging | | | | | |
| **Cooling** | | water cooling (1.5" fitting) | | | | | |
| **Power supply** *(±10 %, 50/60 Hz)* | | 230 V | | | | | |
| **Line protection, connection** | | 6.3 A, Schuko | | | | | |
| **Housing** | | rack, light grey (RAL 7035) | | | | | |
| | *Analyser approx. dimensions (H x W x D)* | 19", 2 x 37 U<br>1920 x 1200 x 1050 mm | | | | | |
| **Weight** | *approx.* | 1600 kg | | | | | |

## TECHNICAL DATA – AIS series

| | | AIS 375/3/P | | AIS 500/3/P | | AIS 750/3/P | | |
|---|---|---|---|---|---|---|---|---|
| **Continuous current** *(max., RMS)* | | 375 A | | 500 A | | 750 A | | |
| **Short-time current** *(max., RMS)* | | 563 A | | 750 A | | 1125 A | | |
| **Current measurement ranges** | *Nominal current (RMS)* | 0.16 A | 0.64 A | 2.5 A | 16 A | 75 A | 300 A | 750 A |
| | *Peak current* | 0.78 A | 3.125 A | 12.5 A | 50 A | 200 A | 800 A | 1500 A |
| **Internal impedance** | | IEC / EN standards | | | | | | |
| | *Phase conductor* | $R_A$: 3.75 mΩ ... 240 mΩ | | in 3.75 mΩ steps | | | | |
| | | $X_A$: 2.34 mΩ ... 150 mΩ | | in 2.34 mΩ steps at 50 Hz | | | | |
| | | $X_A$: 2.81 mΩ ... 180 mΩ | | in 2.81 mΩ steps at 60 Hz | | | | |
| | *Neutral conductor* | $R_N$: 2.5 mΩ ... 160 mΩ | | in 2.5 mΩ steps | | | | |
| | | $X_N$: 1.56 mΩ ... 100 mΩ | | in 1.56 mΩ steps at 50 Hz | | | | |
| | | $X_N$: 1.88 mΩ ... 120 mΩ | | in 1.88 mΩ steps at 60 Hz | | | | |
| | *Max. phase-neutral impedance* | R: 400 mΩ | | | | | | |
| | | X: 250 mΩ at 50 Hz | | (X: 300 mΩ at 60 Hz) | | | | |
| | *Additional impedance inaccuracy* | 1 mΩ | | | | | | |
| | *Max. continuous impedance voltage drop (RMS)* | 30 V | | | | | | |
| | *Max. short term impedance voltage drop (RMS)* | 45 V | | | | | | |
| **Compressed air supply** | | pressure: 5 … 10 bar, connector ¼" NW 7.2 | | | | | | |
| **Impedance adjustment** | | automatic pneumatic bridging | | | | | | |
| **Cooling** | | water cooling (1.5" fitting) | | | | | | |
| **Power supply** *(±10 %, 50/60 Hz)* | | 230 V | | | | | | |
| **Line protection, connection** | | 6.3 A, Schuko | | | | | | |
| **Housing** | | rack, light grey (RAL 7035) | | | | | | |
| | *Analyser approx. dimensions (H x W x D)* | 19", 3 x 42 U<br>2120 x 1800 x 1050 mm | | 19", 3 x 46 U<br>2320 x 1800 x 1050 mm | | 19", 3 x 46 U<br>2320 x 1800 x 1050 mm | | |
| **Weight** | *approx.* | 2500 kg | | 3000 kg | | 4000 kg | | |

## Internal impedance wiring AIS 250/3/P, AIS 375/3/P, AIS 500/3/P, AIS 750/3/P

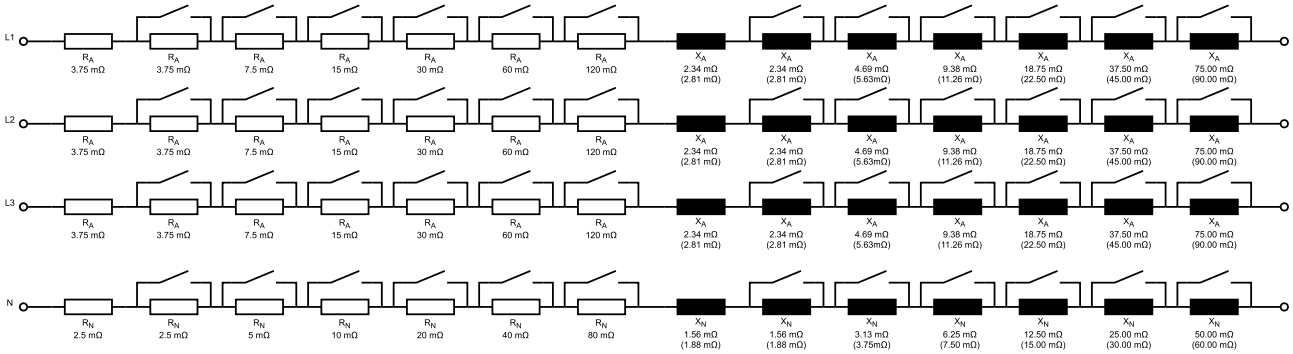



*Fig. 21: IEC / EN standard reference impedance 50 Hz (60 Hz) values for AIS 250/3/P, AIS 375/3/P, AIS 500/3/P, AIS 750/3/P (L1, L2, L3, N)*

## TECHNICAL DATA – AIS series (Japanese / Korean standards add-on)

| | | AIS 32/3/M/JK<br>AIS 32/3/P/JK | AIS 75/3/M/JK<br>AIS 75/3/P/JK | AIS 125/3/P/JK |
|---|---|---|---|---|
| **Additional internal impedance** | | Japanese / Korean standards | | |
| | *Phase conductor* | $R_A$: 0 mΩ / 15 mΩ / 50 mΩ / 55 mΩ / 90 mΩ | | |
| | | $X_A$: 0 mΩ / 34.37 mΩ / 66.67 mΩ / 101.04 mΩ at 50 Hz | | |
| | | $X_A$: 0 mΩ / 41.25 mΩ / 80 mΩ / 121.25 mΩ at 60 Hz | | |
| | *Neutral conductor* | $R_N$: 0 mΩ / 10 mΩ / 190 mΩ | | |
| | | $X_N$: 0 mΩ / 8.33 mΩ / 33.33 mΩ / 41.67 mΩ at 50 Hz | | |
| | | $X_N$: 0 mΩ / 10 mΩ / 40 mΩ / 50 mΩ at 60 Hz | | |
| | *Max. phase-neutral impedance* | R: 680 mΩ | | |
| | | X: 393 mΩ at 50 Hz (X: 471 mΩ at 60 Hz) | | |
| **Line protection, connection** | | 4 A, Schuko | | |
| **Housing** | | plug-in unit or rack, light grey (RAL 7035) | | |
| | *Analyser approx. dimensions (H x W x D)* | 19", 23 U<br>1022 x 483 x 600 mm | 19", 23 U<br>1022 x 483 x 600 mm | 19", 2 x 37 U<br>1920 x 1200 x 1050 mm |
| **Weight** | *approx.* | 210 kg | 300 kg | 1100 kg |

## Internal impedance wiring type JK (Japanese / Korean standards)

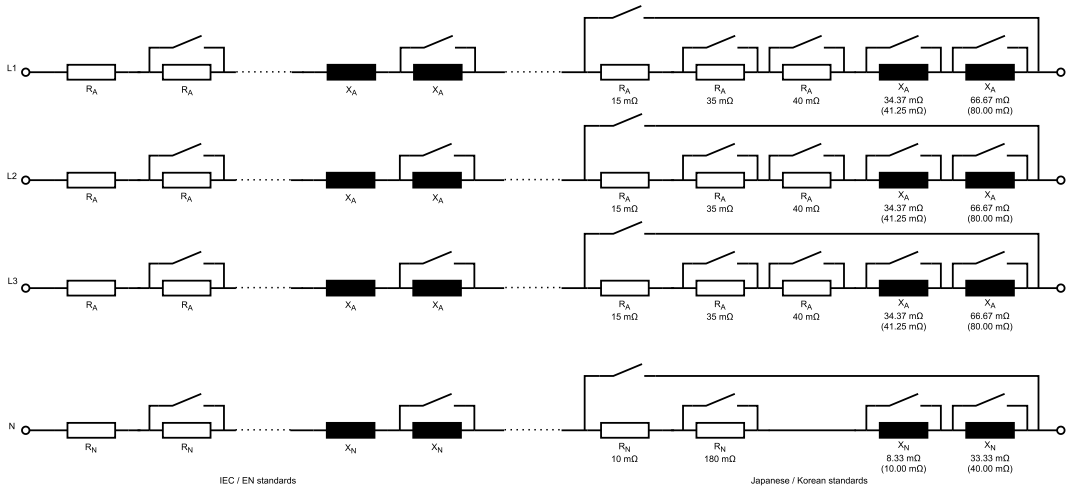



*Fig. 22: Reference impedance 50 Hz (60 Hz) values for all AIS xxx/3/x/JK*

## Note:

- Impedance values for JK type must be added to the IEC / EN impedance values, because of the serial connection of the two impedances.
- When using the AIS xxx/x/JK version the additional JK impedance can be disabled. The remaining impedance is then the adjusted IEC / EN impedance value. The minimum impedance value is the fixed impedance value of the according AIS version.

## AIS OUTPUT CONNECTORS

| AIS type | Output connectors (AIS front panel or external connector panel) |
|---|---|
| AIS 16/1 | 16 A safety socket, 16 A laboratory sockets |
| AIS 16/3 | 16 A CEE (5-pole), 16 A safety socket, 16 A laboratory sockets |
| AIS 32/1 | 32 A CEE (3-pole), 16 A safety socket, 32 A laboratory sockets |
| AIS 32/3, AIS 32/3/M, AIS 32/3/P | 32 A CEE (5-pole), 16 A safety socket, 32 A laboratory sockets |
| AIS 75/1 | 125 A CEE (3-pole), 16 A safety socket, 32 A laboratory sockets |
| AIS 75/3, AIS 75/3/M, AIS 75/3/P | 125 A CEE (5-pole), 16 A safety socket, 32 A laboratory sockets |
| AIS 125/3/P | 125 A CEE (5-pole), 16 A safety socket, 32 A laboratory sockets |
| AIS 250/3/P | copper bars, 32 A laboratory sockets |
| AIS 375/3/P | copper bars, 32 A laboratory sockets |
| AIS 500/3/P | copper bars, 32 A laboratory sockets |
| AIS 750/3/P | copper bars, 32 A laboratory sockets |

## OPTIONS AND ACCESSORIES

| **Options** | | |
|---|---|---|
| **Supply voltage** | | 100 V / 120 V on request |
| **Output connectors** | | 125 A / 63 A / 32 A / 16 A CEE (5-pole)<br>depending on AIS model additional space may be required |
| **PS 16/3** | | Testing according to Appendix B.2 of IEC 61000-3-3 |
| | *Housing approx. dimensions (H x W x D)* | plug-in unit, light grey (RAL 7035)<br>19“, 2 U<br>89 x 483 x 150 mm |
| | *Weight (approx.)* | 3.5 kg |

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