Routine verification checklist (routine check protocol)

Manufacturer of the ASSEMBLY:

Company stamp

Customer:

Order number:

Project:

Type:

1. Degree of protection of enclosures (seals, sealing) IEC 61439-1, section 11.2

Criterion	Requirement	Testing	Assessment [o.k. / n.o.k. / n.c.]	Remark / Examiner
IP-enclosure	IP _____ (from contract)	see contract	☐ ☐ ☐	
Mechanical impact strength of in-door installations (use by ordinary persons)	IK05	see contract	☐ ☐ ☐	
Enclosures suited for outdoor installations (UV-resistance, water protection, dew condensation)	According to data provided by original manufacturer	see contract	☐ ☐ ☐	
Mechanical impact strength of outdoor installations (use by ordinary persons)	IK07	see contract	☐ ☐ ☐	
Verification of the measures taken to achieve the degree of protection	Cable entries, flanges fastened correctly and closed	Visual inspection	☐ ☐ ☐	

2. Clearances and creepage distances IEC 61439-1, section 11.3

Criterion	Requirement	Testing	Assessment [o.k. / n.o.k. / n.c.]	Remark / Examiner
Clearance verification (see Table 1)	Rated impulse withstand voltage U_{imp} =_____V Minimum clearances in air =_____ mm	Visual inspection[1)] [1)] if n.o.k., then Testing for rated peak withstand current U_{imp} pursuant to 10.9.3	☐ ☐ ☐	
Verification of the creepage distances (see Table 2)	Rated insulation voltage U_i =_____ V (Attention: $U_i \geq U_e$) Minimum creepage distance in =_____ mm (Attention: Minimum creepage distance ≥ Minimum clearance in air)	Visual inspection[2)] [2)] if not obviously o.k., then verification by physical measurement	☐ ☐ ☐	

3. Protection against electric shock and continuity of the protective circuits — IEC 61439-1, section 11.4

Criterion	Requirement	Testing	Assessment [o.k. / n.o.k. / n.c.]	Remark / Examiner
Protection against hazardous body currents	• Protection by automatic disconnection ☐ • Protection by double insulation ☐	Plan = implementation 1+2, 3 = n.c. 1+3, 2 = n.c.	☐ ☐ ☐	
1. Verify basic protection	Complete covering of all conductive parts by double insulation	Visual inspection	☐ ☐ ☐	
	Enclosures and covers have completely and as a minimum IPXXB (>1.6 m above the base, minimum IPXXD)	Visual inspection	☐ ☐ ☐	
	If PCII and/or use by ordinary persons: Enclosures and covers have completely and as a minimum IP2XC	Visual inspection	☐ ☐ ☐	
2. Fault protection	Full integration of all components into the protective circuit	Visual inspection	☐ ☐ ☐	
	Complete marking of the protective conductors PE/ PEN	Visual inspection	☐ ☐ ☐	
	Continuous connection of the protective circuit	Resistance measurement < 0.1Ω	☐ ☐ ☐	
	Spot checks screw connections	Torque check	☐ ☐ ☐	
3. Fault protection	No connection of the components to the protective circuit	Visual inspection	☐ ☐ ☐	
	Graphic symbol attached	Visual inspection	☐ ☐ ☐	

4. Assembly of equipment — IEC 61439-1, section 11.5

Criterion	Requirement	Testing	Assessment [o.k. / n.o.k. / n.c.]	Remark / Examiner
Equipment marking (readability / assignment)	Texts comply with manufacturing documentation	Visual inspection	☐ ☐ ☐	
Use of equipment (auxiliary contacts, fuse links)	Complies with wiring diagram	Visual inspection	☐ ☐ ☐	
Equipment arrangement	complies with assembly plan	Visual inspection	☐ ☐ ☐	
Installation position of:				
Breaker actuators (direct drive, rotary drive, motor)	Complies with wiring diagram / assembly plan	Visual inspection	☐ ☐ ☐	
Measurement devices (in door, behind the door)	Complies with assembly plan	Visual inspection	☐ ☐ ☐	
Control and signalling devices	Complies with assembly plan	Visual inspection	☐ ☐ ☐	

5. Internal electrical circuits and connections — IEC 61439-1, section 11.6

Criterion	Requirement	Testing	Assessment [o.k. / n.o.k. / n.c.]	Remark / Examiner
Electrical connections / devices and busbar system (spot checks of the cross-sections and torques)	According to data provided by original manufacturer (spot check matrix)	Spot check and visual inspection	☐ ☐ ☐	

6. Terminals for external conductors		IEC 61439-1, section 11.7		
Criterion	**Requirement**	**Testing**	**Assessment** [o.k. / n.o.k. / n.c.]	**Remark / Examiner**
Outgoing terminals (cross-section, clamping capacity)	Compliance with manufacturing documentation	Visual inspection	☐ ☐ ☐	
Material (copper, aluminium)	Compliance with manufacturing documentation	Visual inspection	☐ ☐ ☐	
Type of contacting (plug-in, screw-in)	Compliance with manufacturing documentation	Visual inspection	☐ ☐ ☐	
Conductor type (flexible, rigid)	Compliance with manufacturing documentation	Visual inspection	☐ ☐ ☐	

7. Mechanical function (actuation elements, interlocks)		IEC 61439-1, section 11.8		
Criterion	**Requirement**	**Testing**	**Assessment** [o.k. / n.o.k. / n.c.]	**Remark / Examiner**
Ventilation grid, assembled, if necessary	Compliance with manufacturing documentation	Visual inspection	☐ ☐ ☐	
Actuation elements (breakers / resetting devices / interlocks / selector switches)	Compliance with manufacturing documentation	Functional and visual inspection	☐ ☐ ☐	
Interlocks / locks	Compliance with manufacturing documentation	Functional and visual inspection	☐ ☐ ☐	
Door couplings / switch actuators	Compliance with manufacturing documentation	Functional and visual inspection	☐ ☐ ☐	
Screw connections / device installation / fastening	According to data provided by original manufacturer	Functional and visual inspection	☐ ☐ ☐	
Cabling / fastening / type of installation	According to data provided by original manufacturer	Visual inspection	☐ ☐ ☐	
Door requirements (door hinge l./r.)	Compliance with manufacturing documentation	Functional and visual inspection	☐ ☐ ☐	
Closure system (double bit, swivel handle, …)	Compliance with manufacturing documentation	Visual inspection	☐ ☐ ☐	
Cabinet and/or enclosure type (wall, floor-standing, modular consumer units)	Compliance with manufacturing documentation	Visual inspection	☐ ☐ ☐	
Screw connections of the mechanical parts (plinths, supply, surface-mounted wall enclosures) fixed	Torque requirements complied with	Functional and visual inspection	☐ ☐ ☐	
Compliance with max. height / width / depth	Compliance with manufacturing documentation	Visual inspection	☐ ☐ ☐	
Plinth dimensions (e.g. 200 mm)	Compliance with manufacturing documentation	Visual inspection	☐ ☐ ☐	
Colour (RAL)	Compliance with manufacturing documentation	Visual inspection	☐ ☐ ☐	
Cable inlet flanges	Compliance with manufacturing documentation	Visual inspection	☐ ☐ ☐	

8. Dielectric properties IEC 61439-1, section 11.9

Criterion	Requirement	Testing	Assessment [o.k. / n.o.k. / n.c.]	Remark / Examiner
Insulation check (10.9.1 General / 10.9.2 Power-frequency withstand voltage) (secure sample by barrier, only the examiner is allowed to the test area. test duration of not less than 1 s.)				
Rated insulation voltage U_i _____ V	Test voltage (AC effective value)		☐ ☐ ☐	
Phase conductor to enclosure / constructive parts	pursuant to Table 8 _____ V	Measurement _____ V	☐ ☐ ☐	
Conductor to conductor		Measurement _____ V	☐ ☐ ☐	
N to PE		Measurement _____ V	☐ ☐ ☐	
Auxiliary circuit to main circuits	pursuant to Table 9 _____ V	Measurement _____ V	☐ ☐ ☐	
Auxiliary circuit to enclosure / constructive parts		Measurement _____ V	☐ ☐ ☐	
As alternative to the insulation test for ASSEMBLIES with an incoming protective device rated up to 250 A: Insulation resistance verification (insulation measurement device with not less than 500 V) Testing of the insulation resistance (>1000 Ω/V per circuit referred to the supply voltage of the circuits to earth)				
Testing of the insulation resistance (>1000 Ω/V per circuit referred to the supply voltage of the circuits to earth)	Compliance with manufacturing documentation	Visual inspection	☐ ☐ ☐	
Phase conductor to enclosure / constructive parts	1k Ω/V * U_e _____V = _____kΩ	Measurement _____ kΩ	☐ ☐ ☐	
Conductor to conductor		Measurement _____ kΩ	☐ ☐ ☐	
N to PE		Measurement _____ kΩ	☐ ☐ ☐	
Auxiliary circuit to main circuits		Measurement _____ kΩ	☐ ☐ ☐	
Auxiliary circuit to enclosure / constructive parts		Measurement _____ kΩ	☐ ☐ ☐	

9. Wiring, operational performance and function — IEC 61439-1, section 11.10

Criterion	Requirement	Testing	Assessment [o.k. / n.o.k. / n.c.]	Remark / Examiner
Cable colours and marking main circuits	IEC 60446 AC/DC: black (brown, grey)	Visual inspection	☐ ☐ ☐	
Cable colours and marking control circuits	IEC 60204 AC: red, DC: blue Exceptions: orange	Visual inspection	☐ ☐ ☐	
Cable colours and marking PE- and N-conductor	IEC 60446 (green/yellow for PE, blue for N, PEN green/yellow with blue marking at the end)	Visual inspection	☐ ☐ ☐	
Wiring /cables / cable and fastening type	No installation to sharp-edged corners and edges	Visual inspection	☐ ☐ ☐	
Wiring and equipment arrangement with regard to interferences / EMC (check for shielded cables, grounding, etc.)	Compliance with manufacturing documentation	Visual inspection	☐ ☐ ☐	
Complies with wiring diagram	Compliance with manufacturing documentation	Functional test	☐ ☐ ☐	
Circuitry / control / interlocks (complete circuitry/ complete control / special circuitry requirements)	Compliance with manufacturing documentation	Functional test	☐ ☐ ☐	
Individual switching devices (where possible, e.g. circuit breaker/RCD)	Compliance with manufacturing documentation	Functional test	☐ ☐ ☐	
Settings (e.g. motor protection switch, circuit breaker)	Compliance with manufacturing documentation	Setting	☐ ☐ ☐	

Criterion	Requirement	Testing	Assessment [o.k. / n.o.k. / n.c.]	Remark / Examiner
Designation label - Name of the manufacturer or trade mark - Type designation or identifier - Date of manufacture - Applied standard IEC 61439-2/-3 - Rated voltage (U_n) - Rated current (I_{nA}) - Rated frequency (f_n) - Degree of protection - Protection class - CE marking	Completed with all numerals and values	Visual inspection	☐ ☐ ☐	
Recorded to the documentation:				
Rated operational voltage		Visual inspection	☐ ☐ ☐	
(U_e) of the outgoing circuits		Visual inspection	☐ ☐ ☐	
Rated impulse withstand voltage (U_{imp})		Visual inspection	☐ ☐ ☐	
Rated insulation voltage (U_i)		Visual inspection	☐ ☐ ☐	
Rated current (I_{nc}) of the outgoing circuits		Visual inspection	☐ ☐ ☐	
Rated Diversity Factor (RDF)		Visual inspection	☐ ☐ ☐	
Rated peak withstand current (I_{pk})		Visual inspection	☐ ☐ ☐	
Rated short-time withstand current (I_{cw})		Visual inspection	☐ ☐ ☐	
Conditional rated short-time withstand current (I_{cc})		Visual inspection	☐ ☐ ☐	
Included in the documentation				
Wiring diagram		Visual inspection	☐ ☐ ☐	
Assembly plan		Visual inspection	☐ ☐ ☐	
Design verification		Visual inspection	☐ ☐ ☐	
Assembly, operating instructions		Visual inspection	☐ ☐ ☐	
CE - Declaration of conformity		Visual inspection	☐ ☐ ☐	
Final testing				
Cleanliness of the installation	No shavings, cable residues, pollution	Visual inspection	☐ ☐ ☐	
Documentation attached		Visual inspection	☐ ☐ ☐	
Enclosure surface	Free from scratches, pollution, pockets	Visual inspection	☐ ☐ ☐	
Installation suited for transport	Fixed to transport means, no loose parts, labels	Visual inspection	☐ ☐ ☐	

Routine verification performed:

Place / Date

Name and signature of the performer

Place / Date

Name and signature of the tester