LABORATORY GENERAL TEST REPORT.

TEST REFERENCE No:	**G2057**
PRODUCT TESTED:	UK JK2 TPN DBO Range {JK2**B(G)} **c/w Surge Protection Device**
ADDITIONAL INFORMATION:	Recommendation from the 18th wiring regulations
CLIENT:	Hager Engineering
CLIENT CONTACT:	C.Howells
NUMBER OF SAMPLES:	1
DATE SAMPLES RECEIVED:	26/09/2019
DATE TEST STARTED:	27/09/2019
LABORATORY TEMPERATURE AND HUMIDITY:	20°C ± 5°C Ambient 50% ± 20% Relative humidity
REASON FOR TESTING:	New Product Introduction: JK201SPD Type 1+2 SPD Kit (Phoenix) JK202SPD Type 2 SPD Kit (Phoenix)
TEST SPECIFICATION OUTLINE:	BS EN 61439-3:2012 incorporating corrigendum 2013/15 **Clause 10 Design Verification**
RESULT:	6.1 Assembly designation marking: **Complies by inspection** 10.2 Strength of materials & parts: No change: Complies 10.3 Degree of protection: No change: Complies 10.4 Clearances & creepage distances: **Complies by inspection** 10.5 Protection against electric shock: No change: Complies 10.6 Incorporation of switching devices & components: **Complies** 10.7 Internal electric circuits & connections: **Complies by inspection** 10.8 Terminals for external conductors: No change: Complies 10.9 Dielectric properties: No change: **Complies by inspection** 10.10 Verification of temperature rise: No change: Complies. 10.11 Short-circuit withstand strength: No change: Complies 10.12 EMC: No change: Complies 10.13 Mechanical Operations: No change: Complies
OBSERVATION/COMMENTS:	Modification changes issued under TMN8**T
TEST ENGINEER:	D.Kelly
APPROVED BY:	I. Ellis
DATE REPORT PREPARED:	27th September 2019

REPORT No:	G2057	DATE OF TEST	27/09/2019

PRODUCT TESTED: JK208BG fitted with JK201SPD / JK202SPD SPD & JK201PM Meter

APPLICABLE STANDARD: BS EN 61439-3:2012 incorporating corrigendum 2013/15
Clause 10 Design Verification

REASON FOR TESTS: Integrate new Type 1 SPD inside JK2**B(G) MCCB Distribution Board for 18th edition Wiring Regulation Main Panel

Note 1:
ASSEMBLY tested (highlighted in yellow) is the smallest Distribution Board in the range and is the most onerous for design verification.

JK2 Panelboards:-

JK208B	JK2 TPN 250A DBO 8 Ways Plain Door
JK208BG	JK2 TPN 250A DBO 8 Ways Glazed Door
JK212B	JK2 TPN 250A DBO 12 Ways Plain Door
JK212BG	JK2 TPN 250A DBO 12 Ways Glazed Door
JK216B	JK2 TPN 250A DBO 16 Ways Plain Door
JK216BG	JK2 TPN 250A DBO 16 Ways Glazed Door
JK218B	JK2 TPN 250A DBO 18 Ways Plain Door
JK218BG	JK2 TPN 250A DBO 18 Ways Glazed Door
JK224B	JK2 TPN 250A DBO 24 Ways Plain Door
JK224BG	JK2 TPN 250A DBO 24 Ways Glazed Door
JK201PM	JK2 Meterpack 250A EW Pluggable Meter Kit
JK201SPD	JK2 Type 1+2 250A Surge Protection Kit
JK202SPD	JK2 Type 2 250A Surge Protection Kit

TEST ENGINEER: D.Kelly
Complies

AP 01 Issue 2 02/03/2016

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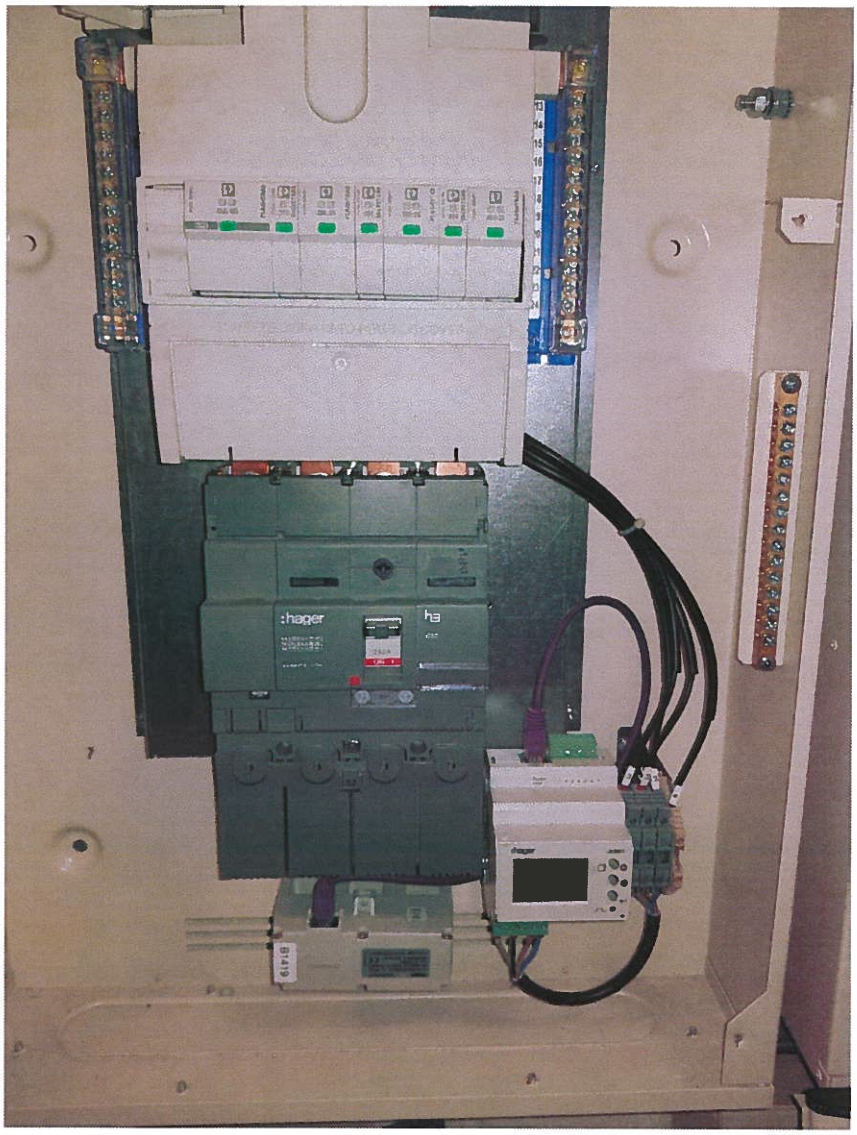
Kit reference : JK201SPD

Type 1+2 Surge Kit



TEST ENGINEER:	D.Kelly **Complies**

hagergroup

ASTA RECOGNIZED TESTING LABORATORY N°:5139

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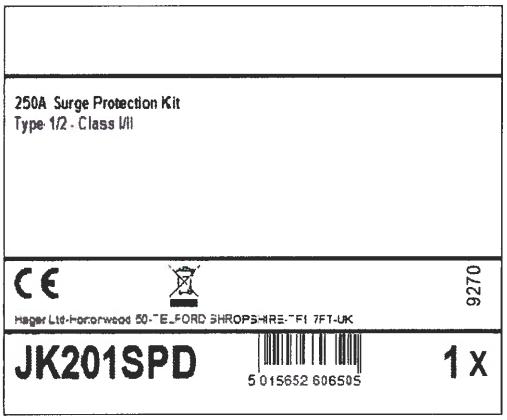
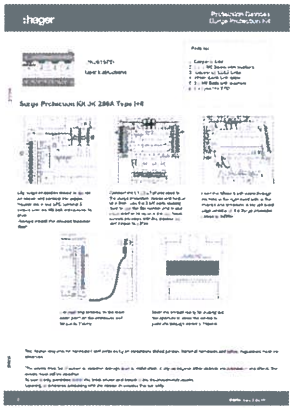
REASON FOR TESTS:	Integrate new Type 1+2 SPD's inside JK2**B(G) MCB Distribution Board for 18th edition Wiring Regulation Main Panel		

Clause 6 Assembly designation marking

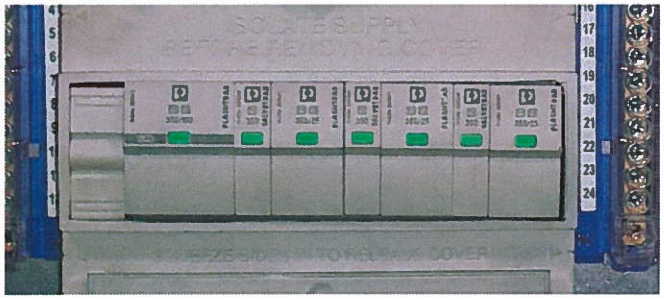
Carton label



ZD0859 User Instructions



Device marking



TEST ENGINEER: D.Kelly

Complies

AP 01 Issue 2 02/03/2016

REPORT No:	G2057	DATE OF TEST	27/09/2019

PRODUCT TESTED: JK208BG fitted with JK201SPD / JK202SPD SPD & JK201PM Meter

APPLICABLE STANDARD: BS EN 61439-3:2012 incorporating corrigendum 2013/15
Clause 10 Design Verification

REASON FOR TESTS: Integrate new Type 1 SPD inside JK2**B(G) MCB Distribution Board for 18th edition Wiring Regulation Main Panel

Clause 10.3 Degree of Protection of ASSEMBLIES

IP rating claimed door closed - IP30 (Probes selected = 2.5mm)
IP rating claimed door open – IP2XC (Probes selected = 2.5mm + finger)
First Numeral Definition – The access probe of 2.5mm shall not penetrate.

Changes to front cover panel verified by test:-
ZM0137S blanks fitted (x4)
SPD Type 1+2 & Type 2 fitted

Complies

Clause 10.4 Clearances & Creepage Distances

SPD Type 1+2
Declared Ratings (Clearances) :
Uimp = 4kV:
Pollution degree = 2, From Table 1, minimum clearance in air = 3.0mm

Distances Between	Distance	Result
SPD L1 – SPD L2	>18mm	> 3.0mm ✓
SPD L2 – SPD L3	>18mm	> 3.0mm ✓
SPD L1 – SPD N	>18mm	> 3.0mm ✓
SPD N – SPD E	>10mm	> 3.0mm ✓

Smallest clearance recorded = ~ 10mm
Refer to G1866 for previous clearances around main MCCB incomer & busbar stack.

Complies

SPD Type 2
Declared Ratings (Clearances) :
Uimp = 4kV:
Pollution degree = 2, From Table 1, minimum clearance in air = 3.0mm

Distances Between	Distance	Result
SPD L1 – SPD L2	>5mm	> 3.0mm ✓
SPD L2 – SPD L3	>5mm	> 3.0mm ✓
SPD L1 – SPD N	>30mm	> 3.0mm ✓
SPD N – SPD E	>40mm	> 3.0mm ✓

Smallest clearance recorded = 5mm
Refer to G1866 for previous clearances around main MCCB incomer & busbar stack.

Complies

TEST ENGINEER: D.Kelly
Complies

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Clause 10.4 Clearances & Creepage Distances - cont

Declared Ratings (Creepages) :
Ui = 690V, Pollution degree = 2, Table F1 x = 1.0mm
From Table 2, minimum creepage distance = 1.8mm
For Nylon PA6 & PA66 SPD housing (Material group 1, CTI = 600), Min creepage distance = 1.8mm

SPD support system made from galvanised steel and copper. SPD device > 10mm (type 1+2) / >5mm (type 2)

Creepage distances not affected by fitting of SPD's - Assessed
Refer to G1866 for previous creepage distances

Complies

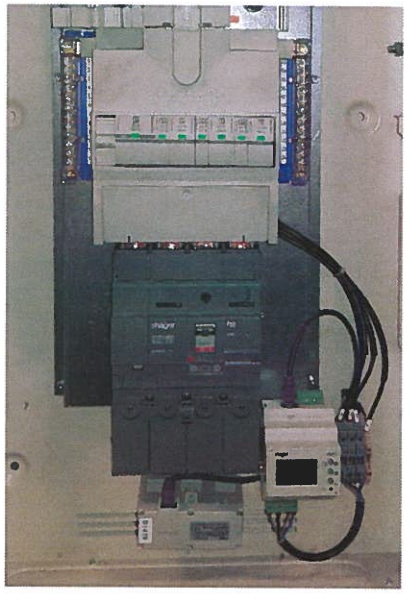
Clause 10.6 Incorporation of switching devices and components

Incomer Arrangement
No change

Outgoing Circuits
No change

Accessory Kits
SPD : Type 1+2 – suitable for all types of earthing
SPD : Type 2 – suitable for TT/TN-S earthing systems
SPD : Suitable for Indoor Use only
SPD : Type 1 EN 61643-11, Type 2 IEC 61643-11
SPD : Temperature range -40°C to +80°C
SPD : Relative Humidity (RH) 5% - 95%
SPD : IP20 – basic insulation

Meter Pack : Same meter JKM01
Meter Pack : Same RI CT 330mV 250A Class 1
Meter Pack : Same cables, longer lengths



Assessed and being used in accordance with Manufacturer's Instructions

Complies

TEST ENGINEER: D.Kelly
Complies

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Clause 10.7 Internal electrical circuits and connections

Compliance with the design requirements of 8.6 for internal electrical circuits and connections shall be confirmed by the original manufacturer's inspection.

Supplementary checks for SPD devices
Suitable for rigid or flexible conductors
Cable actual : 25mm² CSA class 6 Ø0.2mm strand silicon rubber

Cable insulation suitable for high temperatures behind terminal shield

Cable routed from the front behind covers

Cable meets requirements of SPD instructions and manufacturers inspection.

Supplementary checks for JK201PM Meter device (JKM01)
No change to cable specifications / terminations
Cables lengthened only
Cable routed same

Complies

TEST ENGINEER:	D.Kelly **Complies**

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Clause 10.9.2 Di-Electric Properties (Power Frequency Withstand Voltage)

Declared Ratings :

Ui = 690V, Uimp = 4kV, 50/60Hz, Pollution degree = 2
From Table 8, di-electric test voltage **1890V a.c. r.m.s.**

SPD's are not designed to be connected when this type of test is carried out.
ALL cable links should be disconnected to SPD when voltage testing is applied. Assessed

Complies

Clause 10.9.3 Impulse Withstand Voltage

Declared Ratings :

Ui = 690V, Uimp = 4kV, 50/60Hz, Pollution degree = 2
SPD's are not designed to be connected when this type of test is carried out.
JK201PM Meterpack fitted. Fuses to be disconnected for meter and neutral cable disconnected. Assessed.

Complies

TEST ENGINEER: D.Kelly **Complies**

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Clauses not affected or requiring further validation:-

6.1 Assembly designation marking: **Complies by inspection**
6.2 Documentation: **Complies by inspection**
6.3 Device Identification: : **Complies by inspection**
10.2 Strength of materials & parts: No change: Complies G1866
10.3 Degree of protection: No change: Complies G1866
10.4 Clearances & creepage distances: **Complies by inspection**
10.5 Protection against electric shock: No change: Complies G1866
10.6 Incorporation of switching devices & components: **Complies by inspection**
10.7 Internal electric circuits & connections: No change: **Complies by inspection**
10.8 Terminals for external conductors: No change: Complies G1866
10.9 Dielectric properties: No change: **Complies by inspection**
10.10 Temperature Rise: Complies G1866
10.11 Short Circuit Withstand: Complies G1866
10.12 EMC: Complies G1866
10.13 Mechanical Operations: Complies G1866

TEST ENGINEER:	D.Kelly **Complies**