

File E206670
Project 13CA56542

July 23, 2014

REPORT

on

INDUSTRIAL CONTROL SWITCHES

Ace Schmersal Eletroeletrônica Industrial Ltda.
Boituva - São Paulo - Brazil

Copyright © 2014 UL LLC.

UL LLC authorizes the above named company to reproduce this Report only for purposes as described in the Conclusion, provided it is reproduced in its entirety.

DESCRIPTION

PRODUCT COVERED:

USL, CNL -

Enclosed Type, Industrial Control Switches, Models NKF, may be f/b H, f/b 1, f/b 10, 20, 1PW or 2PW, may be f/b Z, f/b B, L or R, f/b xx, M12x1, M16x1,5, M20x1,5 or PG7 f/b any digit

Enclosed Type, Industrial Control Switches, Models NKF, may be f/b H, f/b 2, f/b 10, 20, 1PW or 2PW, f/b 10, 20, 1PW or 2PW, may be f/b Z, f/b B, L or R, f/b xx, M12x1, M16x1,5, M20x1,5, or PG7 f/b any digit

Enclosed Type Industrial Control Switches, Models NKF, may be f/b H, f/b 3, f/b 10, 20, 1PW or 2PW, f/b 10, 20, 1PW or 2PW, f/b 10, 20, 1PW or 2PW, may be f/b Z, f/b B, L or R, f/b xx, M12x1, M16x1,5 M20x1,5, or PG7 f/b any digit

Enclosed Type, Industrial Control Switches, Models NKF, may be f/b H, f/b 4, f/b 10, 20, 1PW or 2PW, f/b 10, 20, 1PW or 2PW, f/b 10, 20, 1PW or 2PW, f/b 10, 20, 1PW or 2PW, may be f/b Z, f/b B, L or R, f/b xx, M12x1, M16x1,5 M20x1,5 or PG7 f/b any digit

Enclosed Type, Industrial Control Switches, Models NKF, may be f/b H, f/b 5, f/b 10, 20, 1PW or 2PW, f/b 10, 20, 1PW or 2PW, f/b 10, 20, 1PW or 2PW, f/b 10, 20, 1PW or 2PW, may be f/b Z, f/b B, L or R, f/b xx, M12x1, M16x1,5 M20x1,5 or PG7 f/b any digit

GENERAL:

These enclosed type, constructed with leads or field wiring terminals, single to five foot switches are intended for use in industrial machinery applications. The devices have not been investigated for use in safety related circuits.

RATINGS:

All switches: 24 Vdc / 1 A, 6k cycles
 240 Vac / 2.5 A GP, 6k cycles

ENVIRONMENTAL RATINGS:

Ambient temperature: 60 °C

Enclosure rating:

Type 1.

ENGINEERING CONSIDERATIONS (NOT FOR UL REPRESENTATIVE USE):

CNL - Indicates investigation to Canadian National Standard(s)
C22.2 No. 14-13.

USL - Indicates investigation to United States Standard UL 508,
(Industrial Control Equipment).

Note: CNL = Canadian National Standards - Listed.
USL = United States Standards - Listed.

NOMENCLATURE BREAKDOWN:

NKF	H	5	-10	/10	/10	/10	/10	Z	-B	-xx	xxx xx
I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII

- I - Model
NFK - All models
- II - Protective cover
Blank - Without protective cover
H - With protective cover
- III - Number of Pedals
5 - 5 pedals
- IV - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- V - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- VI - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- VII - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- VIII - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- IX - Nema Type
* Blank - Nema Type **1**
* Z - Nema Type **1**
- X - Cable entry
B - Rear
L - Left
R - Right

- XI - Connection type Enclosed
 - xx - non-rewirable cable wit lead termination, according to cable length
 - M12x1 - Strain relief M12x1
 - M16x1,5 - Strain relief M16x1,5
 - M20x1,5 - Strain relief M20x1,5
 - PG7 - Strain relief PG7
- XII - Special Customer Order numbers
 - Any digit numbers

NOMENCLATURE BREAKDOWN:

NKF	H	4	-10	/10	/10	/10	Z	-B	-xx	xxxxxx
I	II	III	IV	V	VI	VII	VIII	IX	X	XI

- I - Model
NFK - All models
- II - Protective cover
Blank - Without protective cover
H - With protective cover
- III - Number of Pedals
4 - 4 pedals
- IV - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- V - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- VI - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- VII - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- VIII - Nema Type
* Blank - Nema Type **1**
* Z - Nema Type **1**
- IX - Cable entry
B - Rear
L - Left
R - Right
- X - Connection type Enclosed
xx - non-rewirable cable wit lead termination, according to cable length
M12x1 - Strain relief M12x1
M16x1,5 - Strain relief M16x1,5
M20x1,5 - Strain relief M20x1,5
PG7 - Strain relief PG7

XI - Special Customer Order numbers
Any digit numbers

NOMENCLATURE BREAKDOWN:

NKF	H	3	-10	/10	/10	Z	-B	-xx	xxxx x
I	II	III	IV	V	VI	VII	VIII	IX	X

- I - Model
NFK - All models
- II - Protective cover
Blank - Without protective cover
H - With protective cover
- III - Number of Pedals
3 - 3 pedals
- IV - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- V - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- VI - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- VII - Nema Type
* Blank - Nema Type **1**
* Z - Nema Type **1**
- VIII - Cable entry
B - Rear
L - Left
R - Right
- IX - Connection type Enclosed
xx - non-rewirable cable wit lead termination, according to cable length
M12x1 - Strain relief M12x1
M16x1,5 - Strain relief M16x1,5
M20x1,5 - Strain relief M20x1,5
PG7 - Strain relief PG7
- X - Special Customer Order numbers
Any digit numbers

NOMENCLATURE BREAKDOWN:

NKF	H	2	-10	/10	Z	-B	-xx	xxxx x
I	II	III	IV	V	VI	VII	VIII	IX

- I - Model
NFK - All models
- II - Protective cover
Blank - Without protective cover
H - With protective cover
- III - Number of Pedals
2 - 2 pedals
- IV - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- V - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- VI - Nema Type
* Blank - Nema Type **1**
* Z - Nema Type **1**
- VII - Cable entry
B - Rear
L - Left
R - Right
- VIII - Connection type Enclosed
xx - non-rewirable cable wit lead termination, according to cable length
M12x1 - Strain relief M12x1
M16x1,5 - Strain relief M16x1,5
M20x1,5 - Strain relief M20x1,5
PG7 - Strain relief PG7
- IX - Special Customer Order numbers
Any digit numbers

NOMENCLATURE BREAKDOWN:

NKF	H	1	-10	Z	-B	-xx	xxxxxx
I	II	III	IV	V	VI	VII	VIII

- I - Model
NFK - All models
- II - Protective cover
Blank - Without protective cover
H - With protective cover
- III - Number of Pedals
1 - 1 pedals
- IV - Contact configuration
10 - 1 NO contact
20 - 2 NO contact
1PW - 1 reversible contact
2PW - 2 reversible contact
- V - Nema Type
* Blank - Nema Type **1**
* Z - Nema Type **1**
- VI - Cable entry
B - Rear
L - Left
R - Right
- VII - Connection type Enclosed
xx - non-rewirable cable wit lead termination, according to cable length
M12x1 - Strain relief M12x1
M16x1,5 - Strain relief M16x1,5
M20x1,5 - Strain relief M20x1,5
PG7 - Strain relief PG7
- VIII - Special Customer Order numbers
Any digit numbers

CONSTRUCTION DETAILS:

General - The details of construction are covered in the following photographs and accompanying descriptive pages and illustrations.

Corrosion Protection - All parts of corrosion resistant materials are painted or plated as corrosion protection.

Tolerances - All indicated dimensions are nominal, unless specified otherwise.

Spacings - The minimum spacings are determined in accordance with UL 508, 17th edition (no grounded metal parts) and UL 840, 3rd edition, with respect to Section 39 of UL 508 (based on pollution degree 2).

Spacings at PWB have been evaluated according with table 9.2 of the standard UL 840, 3rd Edition for a pollution degree 2 environment, overvoltage category III and with table 40, column transients limited, uncoated, of the standard C22.2 No.14-13.

Standard requirement	Creepage	Clearance
UL	3.2 mm	1.6 mm
CSA	3.0 mm	1.5 mm

On PWBs the spacings meet the requirements of UL 840, table 9.2 for pollution degree 2 and a CTI of min. 175, 105° min..

Markings - Trade Name or Trademark, model number, electrical ratings, environmental type rating, UL-listing Mark, terminal identifications and wiring diagram are required. The wiring diagram may be provided as part of the installation instructions.

The following markings may be provided separately:

Field Wiring Terminals shall be marked with tightening torque, wire range, "Use Copper Conductors Only".

Cat.No. NKF1 (single pedal version)

FIG 1, 2
ILL 1

General - The Cat.No. NKF1 represents all series. Figure 1 shows a general view of model NKF1. Figure 2 shows a detailed view of model NKF1. Illustration 1 shows the general construction up to 3 pedals.

1. Pedal Cover/Enclosure/Extension - R/C (QMFZ2/8), SABIC INNOVATIVE PLASTICS US L L C, Type C2950HF, Type FR15, Minimum thick 3.3 mm. Rated 5VB, HWI-2, HAI-0 and CTI-2, 85°C.

Alternative - Same as above except, SABIC INNOVATIVE PLASTICS B V, Type C2950, rated 5VB, HWI-1, HAI-0 and CTI-0, 85°C.
2. Back plate - Steel SAE 1020, Overall dimensions 70.0 mm by 115.4 mm, minimum thick 1.8 mm.
3. External foot support - Two provided. Rubber NBR, minimum thick 2.7 mm.
4. Spring pedal - Two provided, Steel. 7.6 mm OD, 21 mm uncompressed, minimum thick 0.5 mm.
5. Internal Actuator - Actuated by pedal, not in contact with live part, 11 mm by 6.7 mm.
6. Spring actuator - One provided, steel. 2.9 mm OD, by 14 mm, minimum thick 0.3 mm.
7. Came - Actuated by internal actuator, not in contact with live part, 5.9 mm by 27.1 mm.
8. Micro switch - R/C (WOYR2/8), Cat. No. DC2C by ZF FRIEDRICHSHAFEN AG ELECTRONIC SYSTEMS. Fixed inside the enclosure by epoxy. Rated 10.1 A 250Vac GP, 1/4hp 125Vac, 6k cycles 120°C.
9. Epoxy - R/C (QMFZ2/8) Type ER2188A, V-0 minimum thick 3.0 mm 130 deg °C.

Alternative - Same as above, except R/C (QMFZ2/8) Type 894HF, V-0, 155 °C.
10. Wiring leads - R/C (AVLV2/8) Style 2464, 80 deg C, 300 Vac.
11. PWB - Any R/C (ZPMV2/8). Used to receive wiring leads and places field wiring terminal. Check nomenclature breakdown - used in conjunction with field wiring terminals.
12. Field wiring terminals - R/C (XCFR2/8) type DG340 by DEGSON ELECTRONICS CO LTD,. Suitable for 24-18 AWG, Wire Type: CU, FW: 2, 300 V, 7 A, UG B, 1.7 lb. in., temperature 105°C.

Alternative - Same as above except, R/C (XCFR2/8) type MKDS1-1727023 by Phoenix Contact. Suitable for 30-16 AWG, Wire Type: CU, FW: 2, 300 V, 10 A, UG B, 2.5 lb. in., temperature 105°C.
13. Strain relief - R/C (QCRV2/8) type HSK-Flex by HUMMEL AG.