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REPORT

On

ENCLOSED BPS MOLDED-CASE SWITCH

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DESCRIPTION

PRODUCT COVERED:

USL - ENCLOSED BPS MOLDED-CASE SWITCH, Types UBCP-15-08, UBCP-15-16, UBCP-15-20, and UBCP-15-25.

GENERAL:

These enclosed switches are intended for connection between power conditioning systems and battery racks in accordance with NFPA 70 "National Electrical Code".

These enclosed switches include disconnect switch units suitable for continuous operation at 100-percent their marked rated load.

Short-circuit current rating of these enclosed switches is 100kA.

These enclosed switches provide no overload or low level fault protection.

These enclosed switches are intended for use in ambient temperatures between -20°C and 50°C.

MARKING:

These devices are marked in accordance with the Standard for Molded-Case Switches and Enclosures. Molded Case Switch enclosures includes:

1. Manufacturer's name or trademark, type designation, catalog number, electrical rating, and switch type to be used.
2. Short-circuit current ratings, including amperes and volts
3. marked "Battery Power Supplies" or "BPS".
4. The panel shall be marked with the DC symbol "≡", as applicable. Rated nominal and maximum dc voltage
5. A wiring diagram indicating the proper connections of the poles in series. (See Ill. 1)
6. For use on ungrounded systems only.
7. Manufacturer's data sheets or instruction book reference

MARKING: (Cont'd)

8. A molded-case switch that includes an accessory device, whether attached to the switch by the manufacturer of the molded-case switch, or by others, is marked to indicate the presence of that accessory.
9. "Type 1 Enclosure"
10. Enclosed BPS Molded-Case switch shall be marked to specify the connector as shown below.
11. ON and OFF positions shall be appropriately marked externally.
12. " The M.C.S is not intended for replacement"
13. "Please check whether main power of PCS and battery rack is cut off. All bus in the panel must be de-energized before servicing." or Equivalent
14. May be marked for field installation of SPD "RAYCAP INC (E316468), designated ProTec T1-1500PV-3+0-S@, rated 1500V, DC PV, In: 20kA, SCCR: 100kA". Installation instructions shall be provided with the enclosed switch detailing the installation of the SPD.

FIELD WIRING TERMINALS:

Connector marked with manufacturer's name or trademark, catalog number, wire range, and Cu. Wire range and "Cu" may be marked on the unit container or on the product.

Connector unit container marked with:

- a) Tool identification
 - * - **1-12 for PPNT0221**
 - **1-12 for PPNO0109**
 - DATH-60 **for PPEO0006**
- b) Location and number of crimps
 - Location: Crimping point of color code
 - Number of crimps: one or two
- c) Catalog number
 - **PPNT0221**
 - **PPNO0109**
 - PPEO0006
- d) Manufacturer's name
 - DONG A BESTECH CO LTD
- e) Wire range
 - 800 kcmil
 - 2/0 AWG
 - 10 AWG

Information sheet marked with: Installation instructions

RATINGS:

Type	No. of Poles	Rated Current, A	Rated Nominal Voltage (V dc)	Rated maximum Voltage (V dc)	Short-circuit current rating (kA)
UBCP-15-08	2	800	1250	1500	100
UBCP-15-16		1600			
UBCP-15-20		2000			
UBCP-15-25		2500			

NOMENCLATURE BREAKDOWN:

UBCP 15 25
 I II III

I	Basic Model Designation	UBCP
II	Type I (according to voltage)	15: 1500Vdc
III	Type II (according to current)	08: 800AF, 16: 1600AF, 20: 2000AF, 25: 2500AF
IV	Type of incoming and outgoing construction	TT / BB (T: TOP, B: BOTTOM)

IV - Optional

CONSTRUCTION DETAILS:

GENERAL - These enclosed switches shall be constructed in accordance with the requirements of the Standard for Molded Case Switches and Enclosures, UL 489, Supplement SC.

CORROSION PROTECTION:

Protected against corrosion by enameling, painting, or galvanizing.

Enclosure & Dead Front Shield Sizes:

Config.	Types		Enclosure Size					Dead Front Shield Size				
			L (mm)	W (mm)	D (mm)	Min. Enclosure Thickness (mm)	ILL.	Feed	L (mm)	W (mm)	T (mm)	Ill.
2500 A (Max.) 1500 Vdc, 100 kA	UBCP- 15- 08, UBCP- 15- 16,	Top Feed (Min)	2410	699	719	2.3	2	Top Feed (Min)	1675	605	2.3	4
		Top Feed (Max)	2660	699	869	2.3	3	Top Feed (Max)	1925	605	2.3	
		Bottom Feed (Min)	2410	699	719	2.3	2	Bottom Feed (Min)	2219	605	2.3	5
		Bottom Feed (Max)	2660	699	869	2.3	3	Bottom Feed (Max)	2469	605	2.3	

The assemblies described in this report are provided with an enclosure sized as noted in this report in the Table for "Enclosure Sizes"

CONSTRUCTION DETAILS: (Cont'd)

The Height of the enclosure is measured except for the height of lifting angles.

WIRING SPACING - The following spacings are required in accordance with clause 18.8.2 of UL489

MINIMUM VENTILATING OPENING SIZE - 5 mm (See Ill. 6)

Type 1 Enclosure

MODEL DIFFERENCE -

All models of the same type of feed construction (Top or Bottom) are identical except for model designation and rated current. (See Ill. 2)

TECHNICAL CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

USL - indicates an investigation to Underwriters Laboratories Standard for Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures, UL 489, 13th Edition.

Outside Profile - Fig. 1

Fig. 1 represent all ENCLOSED BPS MOLDED-CASE SWITCH series.

General - These figures illustrate ENCLOSED BPS MOLDED-CASE SWITCH series's outside construction. The construction of each type is identical except for dimension as described on page 4 in this report.

1. Enclosure Box and Door

Type 1 Enclosure - Painted sheet steel, minimum 2.3 mm thick. See enclosure size table for overall dimension for each enclosure box construction.

- a. Size of the door and each cover
 - Door: min 664 mm by 2342 mm, max 814 mm by 2592 mm
 - Top cover: min 675 mm by 675 mm, max 825 mm by 825 mm
 - Side cover: min 674 mm by 2344.5 mm, max 824 mm by 2594.5 mm
 - Back cover: min 669.2 mm by 2340 mm, max 819.2 mm by 2590 mm
 - Bottom cover: min 599 mm by 565 mm, max 749 mm by 715 mm
- b. Flanges and overlaps between the door and each cover
 - Door: See Ill. 7 for details.
 - Each cover: See Ill. 7 for details.
- c. Fastenings securing the door and each cover
 - The door is secured by 4 hinges
 - Top and bottom covers are secured by M5 bolts maintaining 200 mm between bolts.
 - Side and back covers are secured by M5 bolts maintaining 500 mm between bolts.
- d. Openings in the enclosure including ventilation openings and size of slots through ventilation openings
 - The enclosure has openings for ventilation by filters.
 - The slot size of filters is 5 mm (Ill. 6)
- e. Means for locking
 - Door handle with key lock is applied.

Outside Profile - Fig. 1 (Cont'd)

2. Filter - R/C (NITW2/8), FANDIS SPA (E237844), designated FF20N. 325mm X 325 mm X 24.5 mm, Min. opening 5mm, There are two filter used.
3. Dead Front Assembly - Consisted of three items as below.
 - a. Dead Front Shield - Galvanized sheet steel, minimum 2.3 mm thick. See dead front shield table on page 4 for overall dimension for construction. See Ill. 4 and 5 for details
 - b. DSU Cover - Galvanized sheet steel, minimum 2.3 mm thick. See dead front shield table on page 4 for overall dimension for construction. See Ill. 4 and 5 for details
4. Hinge - The front door is provided with 4 hinges maintaining 555 mm between hinges. See Ill. 8 for details.
5. Door Latch - The front door is provided with a latch mechanism operable by hand. See Ill. 9 for details.
6. TRIM SEAL(Gasket) - R/C (JMST2), TRIM-LOK INC (MH49032), Closed cell sponge type material, designated Trim-Seal VY0101 and EPDM Sponge Tubing C1505CM.
7. Cam Switch Decorated PC cover - R/C (QMFZ2/8), IS-OPTICS CO LTD (E331779), PC, designated ISP-NHFR. see Ill.10 for details.

Door Interior Assembly - Fig. 2

General - These figures illustrate all ENCLOSED BPS MOLDED-CASE SWITCH series's interior construction. The construction of each type is identical except for described in this report. These interiors are mounted into an enclosure sized as noted on Fig.2 for the configuration. See Ill. 11 for circuit schematic.

1. Cam switch - R/C (NKCR2/8), YONGSUNG ELECTRIC CO LTD (E242380), designated YSDNC 3102-C4RP10B. Cam switch is a device for opening and closing of a disconnect switch unit. User can operates a disconnect switch with the door closed. Cam switch is install in the box with key lock on the door.
2. Lamp, green - R/C (NKCR2/8), YONGSUNG ELECTRIC CO LTD (E242380), designated YSPL2-AL22-G. Green lamp indicates 'OFF' status of a disconnect switch unit.
3. Lamp, red - R/C (NKCR2/8), YONGSUNG ELECTRIC CO LTD (E242380), designated YSPL2-AL22-R. Red lamp indicates 'ON' status of a disconnect switch unit.
4. Push button switch - R/C (NKCR2/8), YONGSUNG ELECTRIC CO LTD (E242380), designated YSAP12-30Y. Push button switch carries out the test of the green and red lamp.
5. Emergency button - Listed (NISD), KUN HUNG ELECTRIC CO LTD (E487989), designated KSEP-224-2A-2-2. Emergency button carries out opening of a disconnect switch unit in an emergency. User can open the disconnect switch unit without unlocking any device.
6. Square lamp - R/C (NKCR2/8), YONGSUNG ELECTRIC CO LTD (E242380), designated YBSL33-AL22R14.
7. Control Cable duct - R/C (ZODZ2/8), Cho Yang Electric Co (E365135), PVC, designated CYCWD-S, Type A. Control cable duct is used to organize and protect control cables inside the door.
8. Internal wiring

Control wiring: R/C (AVLV2), CN or CSA Certified, 14 AWG, VW-1 insulation rated min. 600 V, min. 75 °C.

Interior Assembly - Fig. 3

General - These figures illustrate all ENCLOSED PHOTOVOLTAIC MOLDED-CASE SWITCH series's interior construction. The construction of each type is identical except for described in this report. These interiors are mounted into an enclosure sized as noted on Fig.3 for the configuration.

1. LED Light - R/C (NITW2/8), STEGO Elektrotechnik GmbH (E234324), designated LED 025. LED light is installed to lighten inside the enclosure. LED light turns on automatically by a limit switch when the door open.
2. Photovoltaic molded-case switch (DSU) - UL Listed, DSU carries out opening and closing of the main circuit. It can be operable by the cam switch on the door.

Category Code	Manufacturer	File No.	Type	Rating
WJBK	LS ELECTRIC	E491572	UDA- (08~25)E4- 00V- XXXXXXXXXX	2500A (Max.) 1500Vdc, 100kA

3. Common Short busbar - Tin plated Copper, Construction and dimension are tabulated as below.

Cat No. (Assembly)	Series	Current Rating	Ill. No.	Overall Dimension of Components	Bolt/Washer for External Terminal (Per 1 set)
S4303	UBCP-15-08-TT UBCP-15-16-TT UBCP-15-20-TT UBCP-15-25-TT	2500A	12	Copper : 120 by 100 by 94 mm, 10 mm thick	Bolt : M12 x 65 mm, 4EA Nut : M12, 4EA Spring Washer : D12, 4EA Plain Washer : D12, 8EA
S4304		2500 A		Copper : 120 by 120 by 155 mm, 10 mm thick	Bolt : M12 x 65 mm, 4EA Nut : M12, 4EA Spring Washer : D12, 4EA Plain Washer : D12, 8EA
S7011	UBCP-15-08-BB UBCP-15-16-BB UBCP-15-20-BB UBCP-15-25-BB	2500 A	13	Copper : 120 by 169 by 94 mm, 10 mm thick	Bolt : M12 x 65 mm, 4EA Nut : M12, 4EA Spring Washer : D12, 4EA Plain Washer : D12, 8EA
S7012		2500 A		Copper : 120 by 189 by 155 mm, 10 mm thick	Bolt : M12 x 65 mm, 4EA Nut : M12, 4EA Spring Washer : D12, 4EA Plain Washer : D12, 8EA

Interior Assembly - Fig. 3 (Cont'd)

4. SPD (Optional) - Listed (VZCA/7), RAYCAP INC (E316468), designated ProTec T1-1500PV-3+0-S@, SPD type: 1, 1500V, DC PV, MLV: 3000(DC+ - DC-, DC+ -G, DC- - G), MOCV: 1500, In: 20kA, SCCR: 100kA, See Ill. 16 for Electrical drawing.
5. Insulator, LV (Ground Bus Supporter) - R/C (QMFZ2/8), JUNG DO E&P CO LTD (E114090), EP-1500F - Molding furnished as powder.
6. Internal wiring

Control Wiring: R/C (AVLV2), CN or CSA Certified, 3/6/10/14 AWG, VW-1 insulation rated min. 600 V, min. 75 °C
7. SPD Cover - Galvanized sheet steel, minimum 2.3 mm thick. SPD Cover is installed to enclose the SPD and protect the user from high voltage parts of the SPD. See Ill. 17 for details.

Interior Assembly - Fig. 4

1. Bus bar - Tin plated copper. Consisted of two items for each phase as below.
 - a. PCS bus bar
 - 10 mm thick and 120 mm width.
 - It is secured by 3 - M12 bolt&nut sets maintaining 25 mm between bolts.
 - b. Battery bus bar
 - 10 mm thick and 150 mm width.
 - It is secured by 2 - M12 bolts maintaining 112 mm between bolts and 4 - M10 bolt&nut sets that have the pitch circle diameter of 33 mm.
2. Limit switch - R/C (NRNT2/8), KUN HUNG ELECTRIC CO LTD (E117960), designated KH-9015-HRL. Limit switch is used to output the contact signal that is sent to the control circuit of LED light when door opens.
3. Insulator, HV (Main Bus Supporter) - R/C (QEUY2/8), Mar-Bal Inc (E81713), designated 1874-2E. HV Insulator supports the battery bus bars with M12 bolts.
5. Clamp boss - R/C (QMTS2), HAN KUK CARBON CO LTD (E106180), Industrial laminates, designated HP-430, overall 20 mm (diameter), minimum 2 mm thick. Clamp boss surrounds the bolt fastening the clamp body and main circuit bus bars for insulation.
6. PC (partition) - R/C (QMFZ2/8), IS-OPTICS CO LTD (E331779), PC, designated ISP-NHFR. Min. Thick. 3 mm. See Ill.14 for details. PC partition is installed to prevent bolts from falling down when the fuse is replaced.
7. Clamp body - R/C (QMFZ2/8), WORLD BMC CO LTD (E238813), UP, designated PLASET-10A, overall 560 by 60 by 55 mm, minimum 10 mm thick. Clamp body is used to support main circuit bus bars.
8. PC (barrier) - R/C (QMFZ2/8), IS-OPTICS CO LTD (E331779), PC, designated ISP-NHFR. see Ill.15 for details. PC barrier is used to distinguish the type of poles of main circuit bus bars.
9. DSU barrier - R/C (QMFZ2/8), HRS CO LTD (E98818), Silicon Rubber, designated HR-778, overall 140 by 295 mm, minimum 2.5 mm thick. DSU barrier is used for auxiliary protection between main circuit bus bars during maintenance etc. DSU barrier do not affect any performance.