

SPECIFICATION

FOR

600V ETHYLENE PROPYLENE RUBBER INSULATED
POLYCHLOROPRENE SHEATHED FLEXIBLE CABLE

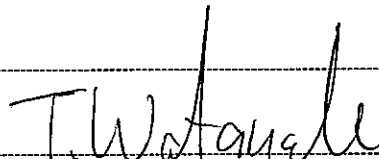
Code : 600V MM-CAR-2PNCT-SX

Quantity

Your Ref. No.

Our Ref. No.

Signed by



Takanobu Watanabe
Manager

Engineering Dept. I
Electric Wire & Cable Business Unit

Proterial, Ltd.

Issue and revision record

| REV. No. | Issue date | Item | Prepared by | Reviewed by | Approved by |
|----------|----------------|---|-------------------------------|-------------------------|-----------------------------------|
| — | Feb. 21, 2024 | FIRST ISSUE | K. Yamane | N. Ono | T. Watanabe |
| 1 | March 21, 2024 | <ul style="list-style-type: none"> • Changed marking method and marking content • Added 600V MM-CAR-2PNCT-SX $3 \times 16\text{mm}^2$ and 600V MM-CAR-2PNCT-SX $16 \times 4\text{mm}^2$ | <i>K. Yamane</i> K. Yamane | <i>N. Ono</i> N. Ono | <i>T. Watanabe</i> T. Watanabe |
| | | | | | |

1. Scope

This specification covers 600V Ethylene Propylene Rubber Insulated Polychloroprene Sheathed Flexible Cable, which is reference to Japanese Electrical Appliance and Material Safety Law or Japanese Electrical Facility Regulation, and Manufacture' s Standard.

This cable shall have flame retardant property as per IEEE Std. 383-1974 paragraph 2. 5, Vertical Tray Flame Test (VTFT).

2. Construction and Materials

2.1 Insulated cores

2.1.1 Conductor

Conductor shall be stranded flexible conductor consisting of tinned annealed copper wires.

A suitable separator tape shall be applied over the conductor.

2.1.2 Insulation

Insulation shall consist of black flame retardant ethylene propylene rubber compound.

Nominal thickness shall be shown in the table 1, 3, 5, 7, 9.

Ave. thick. : not less than 90% of the nominal thickness

Min. thick. : not less than 80% of the nominal thickness

2.1.3 Core identification

The core identification shall be made by the color of insulation or the color of insulation surface as shown in the Fig. 2, 4, 6, 8, 10.

2.2 Drain wire

2.2.1 Conductor

Conductor shall be stranded flexible conductor consisting of tinned annealed copper wires.

2.2.2 Semi-conductive layer

Semi-conductive layer shall consist of semi-conductive rubber compound.

Nominal thickness shall be shown in the table 1, 3, 5, 7, 9.

2.2.3 Core identification

The core identification shall be made by the color of the semi-conductive layer as shown in the Fig. 2, 4, 6, 8, 10.

2.3 Cabling of cores

The insulated conductors and the drain wire shall be cabled.

Suitable rubber filler may be applied at manufacturer's discretion, if necessary.

2.4 Semi-conductive shielding layer

Semi-conductive sheilding layer over the cabled cores and drain wire shall be consist of the semi-conductive rubber compound.

Suitable tape may be applied over the semi-conductive shielding layer at manufacture's discretion, if necessary.

2.5 Sheath

Sheath shall consist of black flame retardant polychloroprene compound.
 Nominal thickness shall be shown in the table 1, 3, 5, 7, 9.
 Ave. thick. : not less than 90% of the nominal thickness
 Min. thick. : not less than 85% of the nominal thickness

A straight line shall be marked on the surface of the sheath.

2.6 Dimension

The dimension of the cable shall be in accordance with the table 1, 3, 5, 7, 9.

3. Marking

The abbreviated description, manufacture's name and year of manufacture shall be marked between the straight lines on the surface of the sheath.

4. Inspection

Inspection shall be made on the following items prior to shipment.

| Properties | Standard to comply with | Requirements | Test interval |
|-----------------------------|-------------------------|---|----------------|
| Construction and dimensions | JIS C 3005 4.3 | To comply with clause 2 and the attached table 1, 3, 5, 7, 9 | Every shipment |
| Withstand voltage test | JIS C 3005 4.6 | To withstand AC 3000V for 1 min. 600V MM-CAR-2PNCT 3×6mm ² 600V MM-CAR-2PNCT 3×16mm ² | |
| | | To withstand AC 3000V for 1 min. 600V MM-CAR-2PNCT 12×4mm ² 600V MM-CAR-2PNCT 16×4mm ² 600V MM-CAR-2PNCT 20×2.5mm ² | First shipment |
| Conductor resistance | JIS C 3005 4.4 | Not more than the value in the attached table 2, 4, 6, 8, 10 | |
| Insulation resistance | JIS C 3005 4.7 | Not less than the value in the attached table 2, 4, 6, 8, 10 | |

5. Guide to use

This cable is designed for carrier drum system (cable tender system) as shown below.

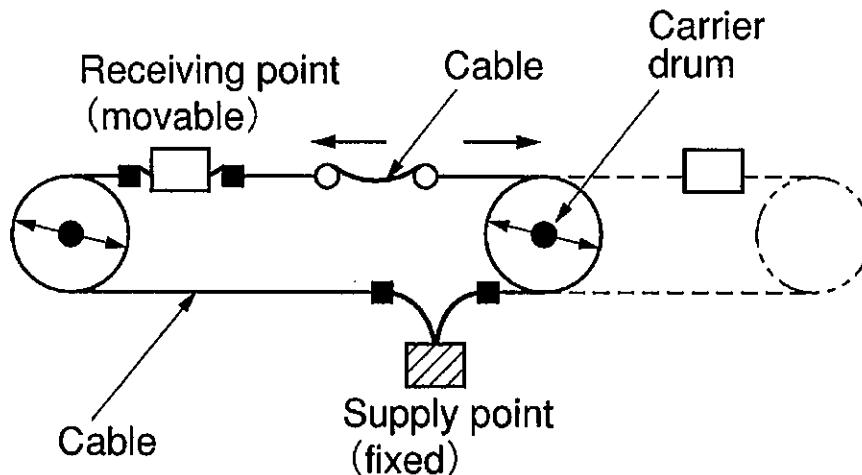


Table 1 : Dimensions
(Code : 600V MM-CAR-2PNCT-SX 3×6mm²)

| Item | | Unit | Specified Value | |
|--|----------------------------|-----------------|-----------------|------------|
| Type of conductor | | — | Insulated core | Drain wire |
| No. of conductor | | — | 3 | 1 |
| Conductor | Nominal cross-section area | mm ² | 6 | 6 |
| | Construction | No. /mm | 84/0.3 | 84/0.3 |
| | Approx. diameter | mm | 3.3 | 3.3 |
| Nominal thickness of insulation | | mm | 1.0 | — |
| Nominal thickness of semi-conductive layer | | mm | — | 1.0 |
| Nominal thickness of semi-conductive shielding layer | | mm | 1.0 | |
| Nominal thickness of sheath | | mm | 2.3 | |
| Approx. diameter of completed cable | | mm | 21 | |
| Maximum diameter of completed cable | | mm | 22.1 | |
| Approx. weight of completed cable | | kg/km | 595 | |

Table 2: Characteristic

| Item | Unit | Specified Value |
|---------------------------------------|-------|-----------------|
| Type of conductor | — | Insulated core |
| Maximum conductor resistance at 20°C | Ω/km | 3.39 |
| Minimum insulation resistance at 20°C | MΩ·km | 400 |
| Permissible minimum bending radius | mm | 130 |

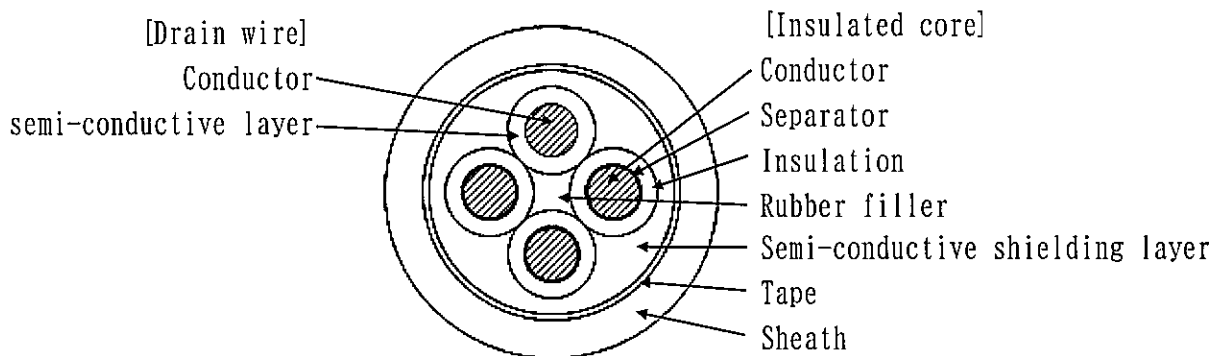


Fig.1 Cable cross section

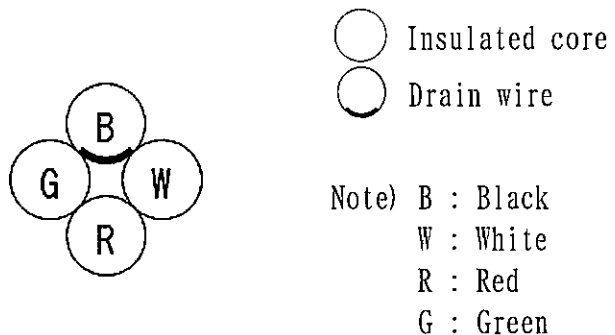


Fig.2 Core identification

Table 3 : Dimensions
 (Code : 600V MM-CAR-2PNCT-SX 3×16mm²)

| Item | | Unit | Specified Value | |
|--|----------------------------|-----------------|-----------------|------------|
| Type of conductor | | — | Insulated core | Drain wire |
| No. of conductor | | — | 3 | 3 |
| Conductor | Nominal cross-section area | mm ² | 16 | 3.5 |
| | Construction | No. /mm | 7/18/0.4 | 45/0.32 |
| | Approx. diameter | mm | 5.9 | 2.5 |
| Nominal thickness of insulation | | mm | 1.2 | — |
| Nominal thickness of semi-conductive layer | | mm | — | 0.8 |
| Nominal thickness of semi-conductive shielding layer | | mm | 1.0 | |
| Nominal thickness of sheath | | mm | 2.7 | |
| Approx. diameter of completed cable | | mm | 27 | |
| Maximum diameter of completed cable | | mm | 28.4 | |
| Approx. weight of completed cable | | kg/km | 1130 | |

Table 4: Characteristic

| Item | Unit | Specified Value |
|---------------------------------------|-------|-----------------|
| Type of conductor | — | Insulated core |
| Maximum conductor resistance at 20°C | Ω/km | 1.24 |
| Minimum insulation resistance at 20°C | MΩ·km | 300 |
| Permissible minimum bending radius | mm | 170 |

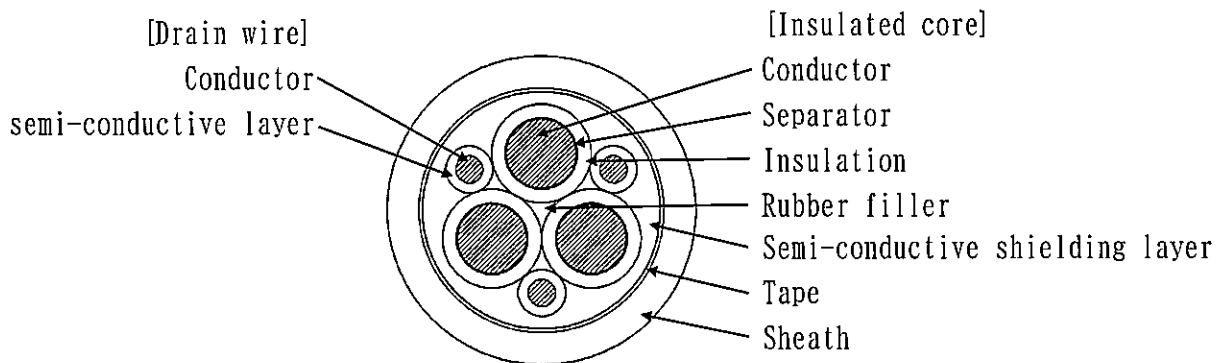


Fig. 3 Cable cross section

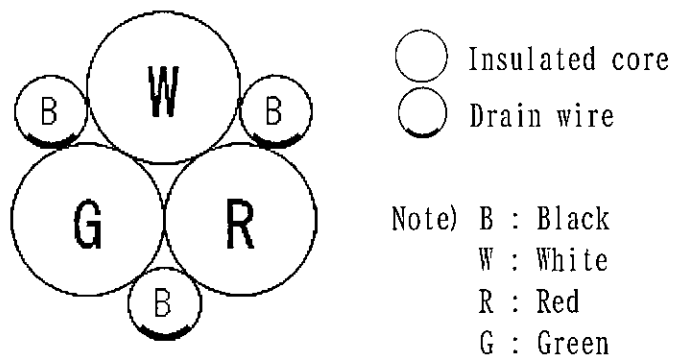


Fig. 4 Core identification

Table 5 : Dimensions
(Code : 600V MM-CAR-2PNCT-SX 12×4mm²)

| Item | | Unit | Specified Value | |
|--|----------------------------|-----------------|-----------------|------------|
| Type of conductor | | — | Insulated core | Drain wire |
| No. of conductor | | — | 12 | 1 |
| Conductor | Nominal cross-section area | mm ² | 4 | 4 |
| | Construction | No. /mm | 56/0.3 | 56/0.3 |
| | Approx. diameter | mm | 2.6 | 2.6 |
| Nominal thickness of insulation | | mm | 1.0 | — |
| Nominal thickness of semi-conductive layer | | mm | — | 1.0 |
| Nominal thickness of semi-conductive shielding layer | | mm | 1.0 | |
| Nominal thickness of sheath | | mm | 2.9 | |
| Approx. diameter of completed cable | | mm | 30 | |
| Maximum diameter of completed cable | | mm | 31.5 | |
| Approx. weight of completed cable | | kg/km | 1270 | |

Table 6: Characteristic

| Item | Unit | Specified Value |
|---------------------------------------|-------|-----------------|
| Type of conductor | — | Insulated core |
| Maximum conductor resistance at 20°C | Ω/km | 5.09 |
| Minimum insulation resistance at 20°C | MΩ·km | 400 |
| Permissible minimum bending radius | mm | 180 |

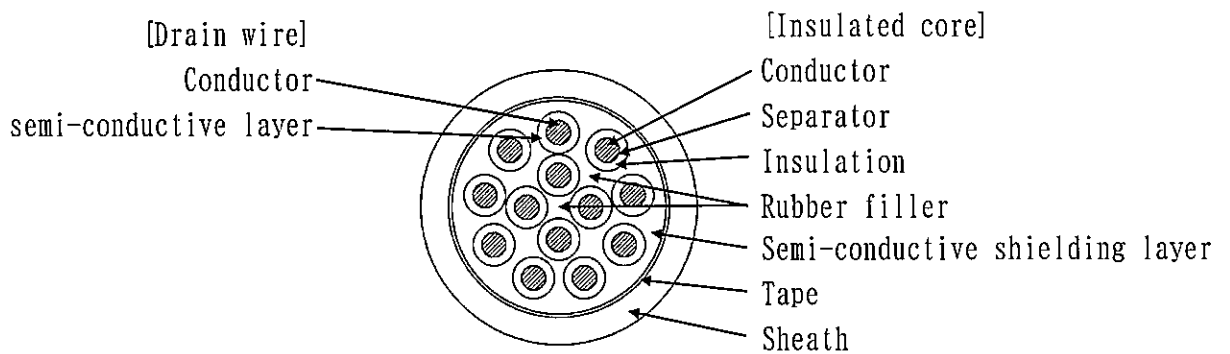


Fig. 5 Cable cross section

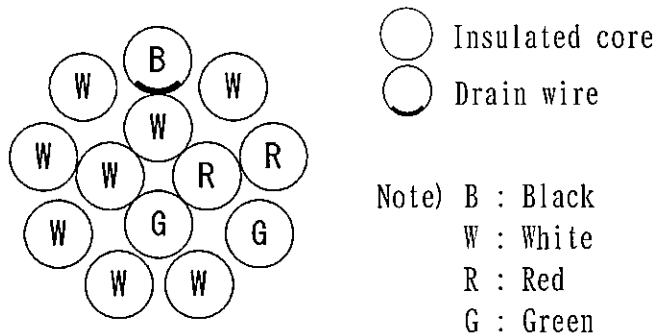


Fig. 6 Core identification

Table 7 : Dimensions
(Code : 600V MM-CAR-2PNCT-SX 16×4mm²)

| Item | | Unit | Specified Value | |
|--|----------------------------|-----------------|-----------------|------------|
| Type of conductor | | — | Insulated core | Drain wire |
| No. of conductor | | — | 16 | 1 |
| Conductor | Nominal cross-section area | mm ² | 4 | 4 |
| | Construction | No. /mm | 56/0.3 | 56/0.3 |
| | Approx. diameter | mm | 2.6 | 2.6 |
| Nominal thickness of insulation | | mm | 1.0 | — |
| Nominal thickness of semi-conductive layer | | mm | — | 1.0 |
| Nominal thickness of semi-conductive shielding layer | | mm | 1.0 | |
| Nominal thickness of sheath | | mm | 3.1 | |
| Approx. diameter of completed cable | | mm | 33 | |
| Maximum diameter of completed cable | | mm | 34.7 | |
| Approx. weight of completed cable | | kg/km | 1700 | |

Table 8: Characteristic

| Item | Unit | Specified Value |
|---------------------------------------|-------|-----------------|
| Type of conductor | — | Insulated core |
| Maximum conductor resistance at 20°C | Ω/km | 5.09 |
| Minimum insulation resistance at 20°C | MΩ·km | 400 |
| Permissible minimum bending radius | mm | 200 |

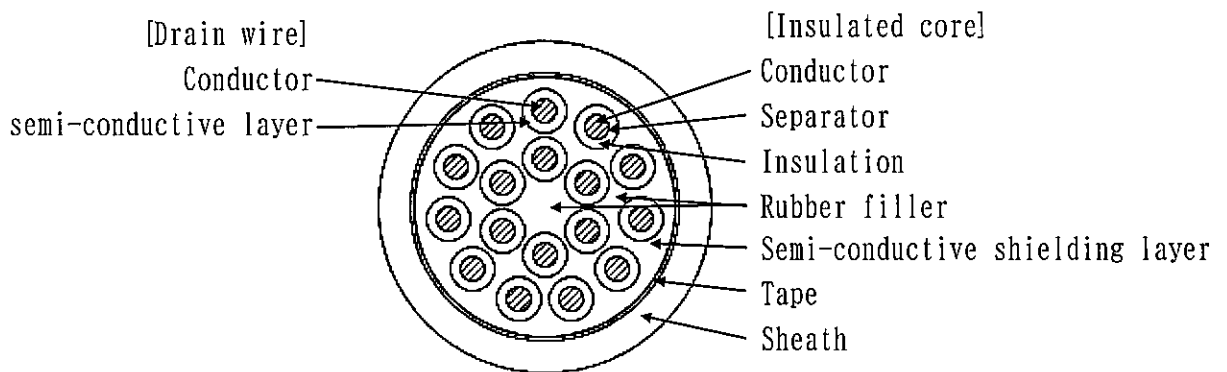


Fig.7 Cable cross section

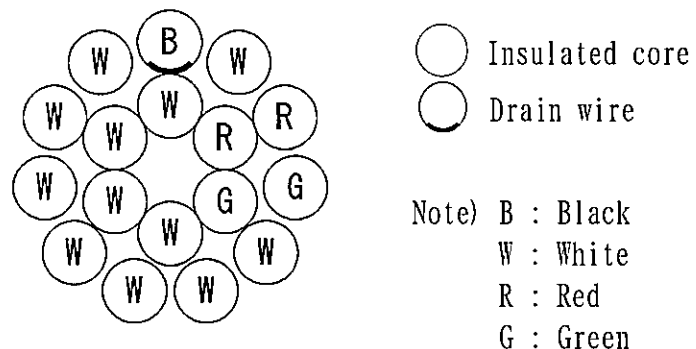


Fig.8 Core identification

Table 9 : Dimensions
 (Code : 600V MM-CAR-2PNCT-SX 20×2.5mm²)

| Item | | Unit | Specified Value | |
|--|----------------------------|-----------------|-----------------|------------|
| Type of conductor | | — | Insulated core | Drain wire |
| No. of conductor | | — | 20 | 1 |
| Conductor | Nominal cross-section area | mm ² | 2.5 | 2.5 |
| | Construction | No. /mm | 49/0.25 | 49/0.25 |
| | Approx. diameter | mm | 2.1 | 2.1 |
| Nominal thickness of insulation | | mm | 0.8 | — |
| Nominal thickness of semi-conductive layer | | mm | — | 0.8 |
| Nominal thickness of semi-conductive shielding layer | | mm | 1.0 | |
| Nominal thickness of sheath | | mm | 2.8 | |
| Approx. diameter of completed cable | | mm | 29 | |
| Maximum diameter of completed cable | | mm | 30.5 | |
| Approx. weight of completed cable | | kg/km | 1220 | |

Table 10: Characteristic

| Item | Unit | Specified Value |
|---------------------------------------|-------|-----------------|
| Type of conductor | — | Insulated core |
| Maximum conductor resistance at 20°C | Ω/km | 8.21 |
| Minimum insulation resistance at 20°C | MΩ·km | 500 |
| Permissible minimum bending radius | mm | 180 |

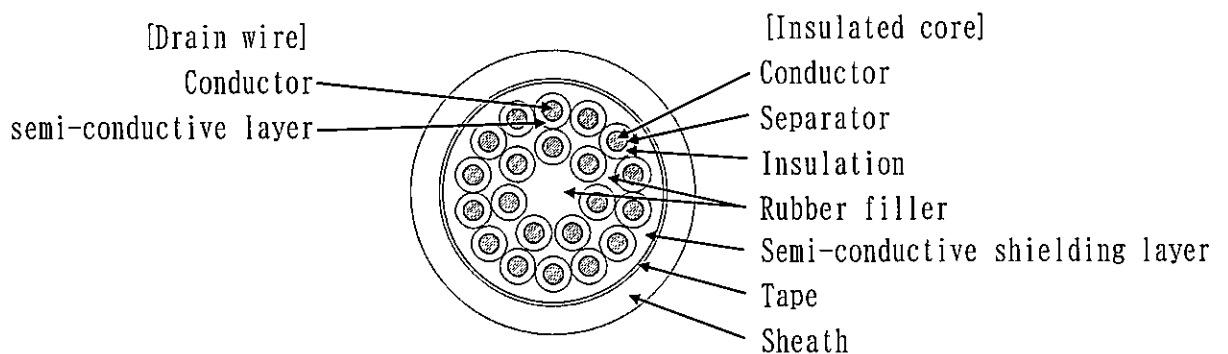


Fig. 9 Cable cross section

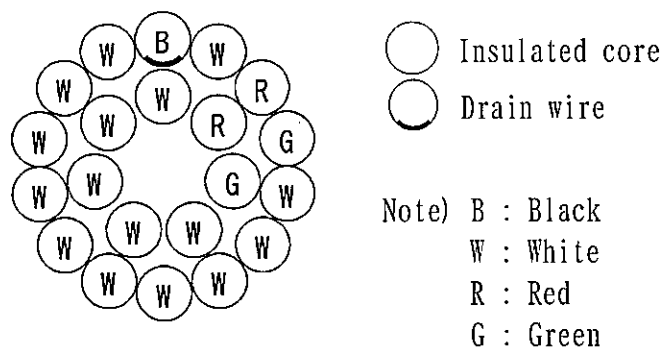


Fig. 10 Core identification