

# EXT-3D/CL3X/2517 300V LF

## Electronic equipment robot cable

|                        |       |                        |       |
|------------------------|-------|------------------------|-------|
| Multi core cable       | ★★★★★ | Multi pair cable       | ★★★★  |
| Heat resistance        | ★★★★★ | Heat resistance        | ★★★★★ |
| Oil resistance         | ★★★★★ | Oil resistance         | ★★★★★ |
| Noise resistance       | ★     | Noise resistance       | ★★    |
| Flame resistance       | ★★★★★ | Flame resistance       | ★★★★★ |
| Torsion resistance     | ★★★★★ | Torsion resistance     | ★★★★★ |
| Flexibility resistance | ★★★★★ | Flexibility resistance | ★★★★★ |
| Cable carrier          | ★★★★★ | Cable carrier          | ★★★★★ |

※The characteristic is an aim.

>>> Meeting standard



| Certification       | EXT-3D LF |               |                  |
|---------------------|-----------|---------------|------------------|
|                     | UL CL3X   | UL AWM        | cUL AWM          |
| Applicable standard | UL13      | UL758         | CSA C22.2 No.210 |
| Official symbol     | CL3X      | UL STYLE 2517 | CSA AWM IIA/B    |
| Voltage rating      | 300V      | 300V          | 300V             |
| Temperature rating  | 105°C     | 105°C         | 105°C            |
| Conductor           | UL13      | UL758         | CSA C22.2 No.210 |
| Flame rating        | VW-1      | VW-1          | FT1              |

### > Application

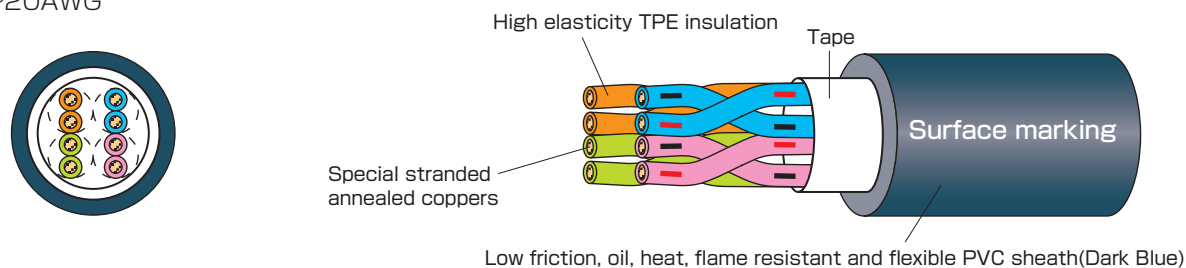
- Appropriate wiring for multi-joint unit portion. (Twist test 20 million times or more.)
- Appropriate for cable chain wiring for high-speed moving. (Cable chain test 20 million times or more.)
- CL3X that is the listing standard is acquired and it corresponds to NFPA70,79.
- Robot cable with UL and cUL at 300V, 105°C. (Category : AVL2, AVL8, QPTZ)

### > Feature

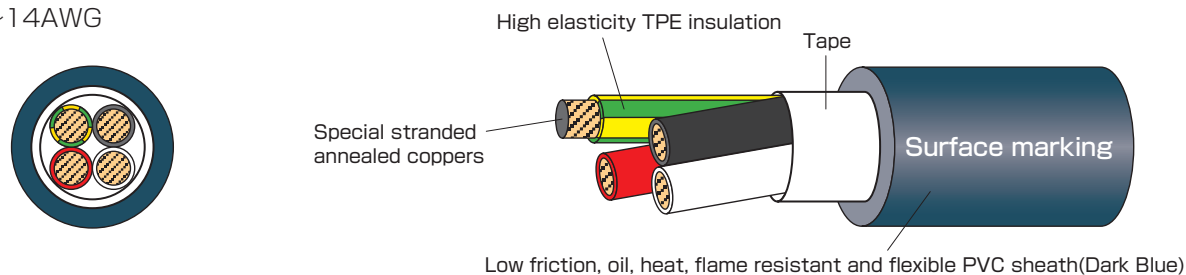
- Extremely fine conductor use.
- High bending elasticity and heat resistant TPE is used for insulation.
- Oil and heat resistant PVC used for sheath.
- Low friction material used for sheath.
- Flame resisting : UL VW-1, cUL FT1.
- IPA Certification (ISO14644-1 Air Cleanliness)  
Uses materials equivalent to the Class 1 certified size.

### > Construction figure

· 24~20AWG



· 18~14AWG



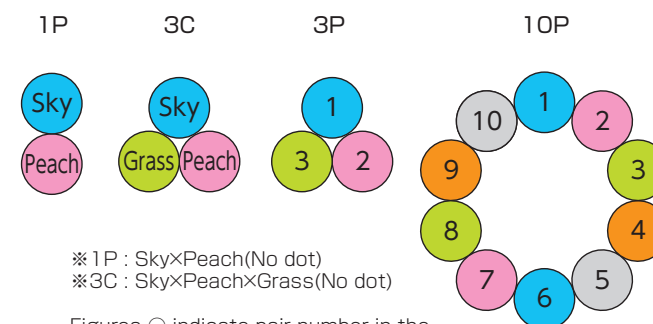
### > Surface marking



※R15 indicates "Compliant with RoHS Directive 2011/65/EU and Directive (EU) 2015/863 (10 substances)".

### > Identification

· 24~20AWG



※ 1P : Sky×Peach(No dot)  
※ 3C : Sky×Peach×Grass(No dot)

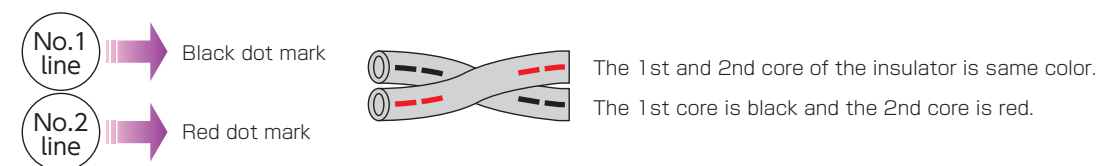
Figures ○ indicate pair number in the identification table.

※ A short point is 1mm, the length point is 2mm, the interval is 1mm, and the pitch is about 12mm.

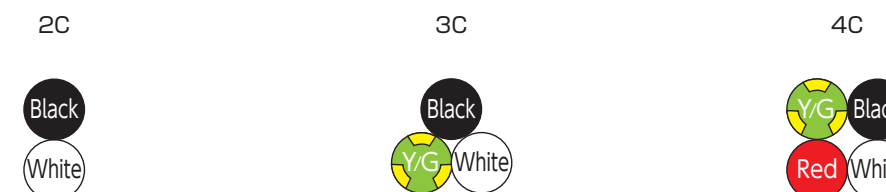
#### ● Identification table

| Pair number | Color of insulation | Dot mark | Pair number | Color of insulation | Dot mark |
|-------------|---------------------|----------|-------------|---------------------|----------|
| 1           | Sky                 | —        | 16          | Sky                 | —        |
| 2           | Peach               | —        | 17          | Peach               | —        |
| 3           | Grass               | —        | 18          | Grass               | —        |
| 4           | Orange              | —        | 19          | Orange              | —        |
| 5           | Gray                | —        | 20          | Gray                | —        |
| 6           | Sky                 | —        | 21          | Sky                 | —        |
| 7           | Peach               | —        | 22          | Peach               | —        |
| 8           | Grass               | —        | 23          | Grass               | —        |
| 9           | Orange              | —        | 24          | Orange              | —        |
| 10          | Gray                | —        | 25          | Gray                | —        |
| 11          | Sky                 | —        | 26          | Sky                 | —        |
| 12          | Peach               | —        | 27          | Peach               | —        |
| 13          | Grass               | —        | 28          | Grass               | —        |
| 14          | Orange              | —        | 29          | Orange              | —        |
| 15          | Gray                | —        | 30          | Gray                | —        |

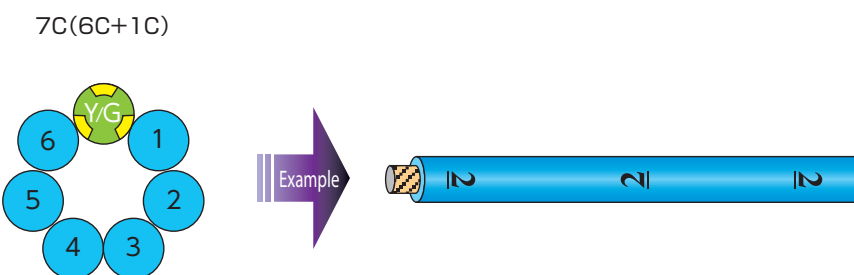
#### ● Example of pair



· 18~14AWG



· 7 cores or more is identified by numbering



※ Y/G indicates green core with yellow stripe(30~50%). Figures in ○ indicate black numbering on light blue insulator.

## Electronic equipment robot cable



### > Construction table

| No. of cores<br>No. of pairs | Conductor     |                           |                          | High elasticity TPE insulation |                          | Low friction, oil, heat, flame resistant and flexible PVC sheath |                                  | Approx. weight<br>(lbs/1000ft)<br>(kg/km) | Electrical Characteristics         |                                     |                                  | Allowable ampacity<br>(A) |
|------------------------------|---------------|---------------------------|--------------------------|--------------------------------|--------------------------|--|----------------------------------|---|------------------------------------|-------------------------------------|----------------------------------|---------------------------|
|                              | Size<br>(AWG) | Construction<br>(Line/mm) | Outside diameter<br>(mm) | Outside diameter<br>(inch)     | Outside diameter<br>(mm) | Overall diameter<br>approx. (inch)                               | Overall diameter<br>approx. (mm) |   | Conductor resistance<br>(Ω/km20°C) | Insulation resistance<br>(MΩkm20°C) | Electrical strength<br>(V/1min.) |                           |
| 1P                           |               |                           |                          |                                |                          | 0.154  | 3.9                              | 12(18)                                    | ~91.1                              |                                     |                                  | 5.3                       |
| 3C                           |               |                           |                          |                                |                          | 0.157  | 4.0                              | 15(22)                                    | ~89.3                              |                                     |                                  | 4.4                       |
| 2P                           |               |                           |                          |                                |                          | 0.193  | 4.9                              | 19(29)                                    |                                    |                                     |                                  | 4.2                       |
| 3P                           |               |                           |                          |                                |                          | 0.217  | 5.5                              | 25(37)                                    |                                    |                                     |                                  | 3.6                       |
| 4P                           | 24            | 41/0.08                   | 0.59                     | 0.039                          | 0.99                     | 0.236  | 6.0                              | 30(45)                                    | ~91.1                              | 100~                                | 2000                             | 3.2                       |
| 5P                           | (0.204mil)    | (41/3.2mil)               | (23mil)                  |                                |                          | 0.252  | 6.4                              | 37(55)                                    |                                    |                                     |                                  | 3.0                       |
| 7P                           |               |                           |                          |                                |                          | 0.295  | 7.5                              | 47(70)                                    |                                    |                                     |                                  | 2.7                       |
| 8P                           |               |                           |                          |                                |                          | 0.315  | 8.0                              | 50(75)                                    |                                    |                                     |                                  | 2.6                       |
| 10P                          |               |                           |                          |                                |                          | 0.370  | 9.4                              | 71(105)                                   |                                    |                                     |                                  | 2.5                       |
| 12P                          |               |                           |                          |                                |                          | 0.413  | 10.5                             | 84(125)                                   |                                    |                                     |                                  | 2.4                       |
| 1P                           |               |                           |                          |                                |                          | 0.165  | 4.2                              | 15(22)                                    | ~57.6                              |                                     |                                  | 6.9                       |
| 3C                           |               |                           |                          |                                |                          | 0.173  | 4.4                              | 19(28)                                    | ~56.5                              |                                     |                                  | 5.8                       |
| 2P                           |               |                           |                          |                                |                          | 0.213  | 5.4                              | 26(38)                                    |                                    |                                     |                                  | 5.5                       |
| 3P                           |               |                           |                          |                                |                          | 0.240  | 6.1                              | 32(48)                                    |                                    |                                     |                                  | 4.8                       |
| 4P                           | 22            | 65/0.08                   | 0.75                     | 0.045                          | 1.15                     | 0.260  | 6.6                              | 37(55)                                    | ~57.6                              | 100~                                | 2000                             | 4.3                       |
| 5P                           | (0.324mil)    | (65/32mil)                | (30mil)                  |                                |                          | 0.283  | 7.2                              | 47(70)                                    |                                    |                                     |                                  | 4.0                       |
| 7P                           |               |                           |                          |                                |                          | 0.346  | 8.8                              | 67(100)                                   |                                    |                                     |                                  | 3.6                       |
| 8P                           |               |                           |                          |                                |                          | 0.370  | 9.4                              | 74(110)                                   |                                    |                                     |                                  | 3.5                       |
| 10P                          |               |                           |                          |                                |                          | 0.417  | 10.6                             | 94(140)                                   |                                    |                                     |                                  | 3.3                       |
| 12P                          |               |                           |                          |                                |                          | 0.472  | 12.0                             | 104(155)                                  |                                    |                                     |                                  | 3.2                       |
| 1P                           |               |                           |                          |                                |                          | 0.181  | 4.6                              | 19(29)                                    | ~35.7                              |                                     |                                  | 9.2                       |
| 3C                           |               |                           |                          |                                |                          | 0.189  | 4.8                              | 24(35)                                    | ~35.0                              |                                     |                                  | 7.8                       |
| 2P                           |               |                           |                          |                                |                          | 0.240  | 6.1                              | 34(50)                                    |                                    |                                     |                                  | 7.4                       |
| 3P                           |               |                           |                          |                                |                          | 0.272  | 6.9                              | 44(65)                                    |                                    |                                     |                                  | 6.4                       |
| 4P                           | 20            | 108/0.08                  | 0.96                     | 0.054                          | 1.36                     | 0.295  | 7.5                              | 54(80)                                    | ~35.7                              | 100~                                | 2000                             | 5.8                       |
| 5P                           | (0.518mil)    | (108/3.2mil)              | (38mil)                  |                                |                          | 0.335  | 8.5                              | 71(105)                                   |                                    |                                     |                                  | 5.4                       |
| 7P                           |               |                           |                          |                                |                          | 0.390  | 9.9                              | 94(140)                                   |                                    |                                     |                                  | 4.9                       |
| 8P                           |               |                           |                          |                                |                          | 0.421  | 10.7                             | 108(160)                                  |                                    |                                     |                                  | 4.7                       |
| 10P                          |               |                           |                          |                                |                          | 0.484  | 12.3                             | 138(205)                                  |                                    |                                     |                                  | 4.4                       |
| 12P                          |               |                           |                          |                                |                          | 0.547  | 13.9                             | 168(250)                                  |                                    |                                     |                                  | 4.2                       |
| 2C                           |               |                           |                          |                                |                          | 0.224  | 5.7                              | 30(44)                                    |                                    |                                     |                                  | 12                        |
| 3C                           |               |                           |                          |                                |                          | 0.236  | 6.0                              | 37(55)                                    |                                    |                                     |                                  | 12                        |
| 4C                           |               |                           |                          |                                |                          | 0.256  | 6.5                              | 44(65)                                    |                                    |                                     |                                  | 11                        |
| 7C                           | 18            | 168/0.08                  | 1.31                     | 0.075                          | 1.91                     | 0.339  | 8.6                              | 77(115)                                   | ~22.3                              | 100~                                | 2000                             | 8.8                       |
| 9C                           | (0.823mil)    | (168/3.2mil)              | (52mil)                  |                                |                          | 0.386  | 9.8                              | 101(150)                                  |                                    |                                     |                                  | 8.1                       |
| 11C                          |               |                           |                          |                                |                          | 0.441  | 11.2                             | 124(185)                                  |                                    |                                     |                                  | 7.6                       |
| 13C                          |               |                           |                          |                                |                          | 0.488  | 12.4                             | 151(225)                                  |                                    |                                     |                                  | 7.3                       |
| 3C                           |               |                           |                          |                                |                          | 0.264  | 6.7                              | 50(75)                                    |                                    |                                     |                                  | 17                        |
| 4C                           | 16            | 266/0.08                  | 1.64                     | 0.088                          | 2.24                     | 0.287  | 7.3                              | 64(95)                                    | ~13.9                              | 100~                                | 2000                             | 14                        |
| 7C                           | (1.30mil)     | (266/3.2mil)              | (65mil)                  |                                |                          | 0.382  | 9.7                              | 108(160)                                  |                                    |                                     |                                  | 11                        |
| 3C                           |               |                           |                          |                                |                          | 0.311  | 7.9                              | 71(105)                                   | ~8.77                              | 100~                                | 2000                             | 23                        |
| 4C                           | 14            | 420/0.08                  | 2.07                     | 0.109                          | 2.77                     | 0.354  | 9.0                              | 94(140)                                   |                                    |                                     |                                  | 20                        |

※ 18AWG and 3C or more has the [Y/G] earth cable of an equal size.  
 ※ The test of 2000V/5 minute besides the withstand voltage test on above mentioned UL standard and the CSA standard is applied.

### > Allowable ampacity

·The allowable ampacity of this catalog is a value at one in the air construction and the ambient temperature 30°C.

·Allowable ampacity is calculated based on JCS0168.

·Allowable ampacity is calculated excluding grounding conductor.

·Please multiply the following adjustment factors by the ambient temperature.

Note) Please refer to P.270 when you use this cable according to NFPA 70 or NFPA 79.

#### ● Adjustment factors (at ambient temperature)

| Ambient temperature (°C) | 30   | 40   | 50   | 60   | 70   | 80   | 90   | 100  |
|--------------------------|------|------|------|------|------|------|------|------|
| Adjustment factors       | 1.00 | 0.93 | 0.86 | 0.77 | 0.68 | 0.58 | 0.45 | 0.26 |

### > Movement characteristic

| Bending | Bend | U-shaped turn-back | 90° bending | Twist    |         | Move bending |
|---------|------|--------------------|-------------|----------|---------|--------------|
|         |      |                    |             | Straight | Bending |              |
| A       | A    | S                  | A           | S        | A       | C            |

Examination's time:  
 S= More than 20 million times  
 A= More than 10 million times  
 B= More than 5 million times  
 C= More than 3 million times

※ Please consult our Sales Department when using by moving part.

It is C when overall diameter of the cable is 20mm or more, and D when overall diameter of the cable is 30mm or more.

When overall diameter of the cable is 20mm or less.

※ The longevity of the cable inside a cable bearing is dependent on the travel distance.

Please consult our Sales Department when wiring a travel distance of 5m or greater.

### > Oil resistance

| Insulating oil | Lubricating oil | Cutting oil I | Cutting oil II | Hydraulic oil | Grease |
|----------------|-----------------|---------------|----------------|---------------|--------|
| A              | A               | B             | B              | B             | B      |

※ A~C in the table indicate the characteristics below.

A: There is no problem on practical use at all.

B: Deterioration slightly no problem almost on practical use.

C: It is sometimes deteriorated to some degree, and not possible to use it.

### > Standard sales length

100m

(Sales by short length is available for large sizes.)

Please contact us which sizes are available.)