

## Watertight CEE-Form Plugs and Receptacles and Switch Socket

Tapones y recipientes estancos con forma CEE

防水 CEE 型プラグ・レセプタクル 防水 CEE 型插头、插座

### CEE Male Plugs – AC110V, Yellow Colour

Unit Per Pcs.

| CODE     | Pole | Amp | H | IP |
|----------|------|-----|---|----|
| 79 27 59 | 3    | 16  | 4 | 44 |
| 79 27 60 |      | 32  |   |    |
| 79 27 67 |      | 16  | 6 | 67 |



### CEE Female Plugs – AC110V, Yellow Colour

Unit Per Pcs.

| CODE     | Pole | Amp | H | IP |
|----------|------|-----|---|----|
| 79 27 68 | 3    | 16  | 4 | 44 |
| 79 27 69 |      | 32  |   |    |
| 79 27 70 |      | 16  | 4 | 67 |



### CEE Male Plugs – AC220V Blue Colour

Unit Per Pcs.

| CODE     | Pole | Amp | H  | IP |
|----------|------|-----|----|----|
| 79 27 01 | 3    | 16  | 6  | 44 |
| 79 27 02 |      | 32  |    |    |
| 79 27 03 |      | 16  |    |    |
| 79 27 04 | 32   | 6   | 67 |    |
| 79 27 05 |      | 63  |    |    |
| 79 27 06 | 4    | 16  | 9  | 44 |
| 79 27 07 |      | 32  |    |    |



### CEE Female Plugs – AC230V, Blue Colour

Unit Per Pcs.

| CODE     | Pole | Amp | H  | IP |
|----------|------|-----|----|----|
| 79 27 77 | 3    | 16  | 6  | 44 |
| 79 27 78 |      | 32  |    |    |
| 79 27 79 |      | 16  |    |    |
| 79 27 80 | 32   | 6   | 67 |    |
| 79 27 81 |      | 63  |    |    |
| 79 27 82 | 4    | 16  | 9  | 44 |
| 79 27 83 |      | 32  |    |    |



### CEE Male Plugs – AC380V, Red Colour

Unit Per Pcs.

| CODE     | Pole | Amp | H  | IP |
|----------|------|-----|----|----|
| 79 27 08 | 4    | 16  | 6  | 44 |
| 79 27 09 |      | 32  |    |    |
| 79 27 10 |      | 16  |    |    |
| 79 27 11 | 32   | 6   | 67 |    |
| 79 27 12 |      | 63  |    |    |
| 79 27 13 | 5    | 125 |    |    |
| 79 27 14 |      | 16  | 6  | 44 |
| 79 27 15 |      | 32  |    |    |
| 79 27 16 |      | 16  |    |    |
| 79 27 17 |      | 32  | 6  | 67 |
| 79 27 18 | 63   |     |    |    |
| 79 27 19 |      | 125 |    |    |



### CEE Female Plugs – AC380V/400V, Red Colour

Unit Per Pcs.

| CODE     | Voltage | Pole | Amp | H  | IP |
|----------|---------|------|-----|----|----|
| 79 27 20 | 4       |      | 16  | 6  | 44 |
| 79 27 21 |         |      | 32  |    |    |
| 79 27 22 |         |      | 16  |    |    |
| 79 27 23 | 32      |      | 6   | 67 |    |
| 79 27 24 |         |      | 63  |    |    |
| 79 27 25 | 5       |      | 125 |    |    |
| 79 27 26 |         |      | 16  | 6  | 44 |
| 79 27 27 |         |      | 32  |    |    |
| 79 27 28 |         |      | 16  |    |    |
| 79 27 29 |         |      | 32  | 6  | 67 |
| 79 27 30 | 63      |      | 6   |    |    |
| 79 27 31 |         |      | 125 |    |    |
| 79 27 84 | 400     | 4    | 16  | 6  | 67 |



### CEE Receptacles – AC110V, Red Colour

Unit Per Pcs.

| CODE     | Pole | Amp | H  | IP |
|----------|------|-----|----|----|
| 79 27 85 | 3    |     | 16 |    |
| 79 27 86 |      |     | 32 |    |
| 79 27 87 |      |     | 16 |    |
| 79 27 88 | 3    |     | 6  | 44 |
|          |      |     | 32 | 67 |



### CEE Receptacles – AC220V, Blue Colour

Unit Per Pcs.

| CODE     | Pole | Amp | H  | IP |
|----------|------|-----|----|----|
| 79 27 32 | 3    |     | 16 |    |
| 79 27 33 |      |     | 32 |    |
| 79 27 34 |      |     | 16 |    |
| 79 27 35 | 3    |     | 32 |    |
| 79 27 36 |      |     | 63 |    |
| 79 27 37 | 4    |     | 16 | 67 |
| 79 27 38 |      | 5   | 32 | 44 |



### CEE Receptacles – AC380V/400V, Red Colour

Unit Per Pcs.

| CODE     | Voltage | Pole | Amp | H | IP |
|----------|---------|------|-----|---|----|
| 79 27 39 | 4       |      | 16  | 6 | 44 |
| 79 27 40 |         |      | 32  |   |    |
| 79 27 41 |         |      | 16  |   |    |
| 79 27 42 | 5       |      | 32  |   |    |
| 79 27 43 |         |      | 63  |   |    |
| 79 27 44 | 380     |      | 125 |   |    |
| 79 27 45 |         |      | 16  | 6 | 44 |
| 79 27 46 |         |      | 32  |   |    |
| 79 27 47 |         |      | 16  |   |    |
| 79 27 48 |         |      | 32  | 6 | 67 |
| 79 27 49 | 400     |      | 63  |   |    |
| 79 27 50 |         |      | 125 |   |    |
| 79 27 89 |         | 4    | 32  | 3 | 67 |



### Switch Sockets – AC110V - 400V, Red Colour

Unit Per Pcs.

| CODE     | Voltage | Pole | Amp | IP |
|----------|---------|------|-----|----|
| 79 27 90 | 230     |      | 16  |    |
| 79 27 91 |         |      | 16  |    |
| 79 27 92 |         |      | 32  |    |
| 79 27 93 | 400     |      | 16  |    |
| 79 27 94 |         |      | 32  |    |
| 79 27 95 | 110     |      | 16  |    |
| 79 27 96 |         |      | 16  |    |
| 79 27 97 | 230     |      | 32  |    |
| 79 27 98 |         |      | 32  |    |
| 79 27 99 | 400     |      | 16  |    |
|          |         |      | 32  |    |



### Watertight Plugs & Receptacles Synthetic Resin

Clavijas y Base Estanca/Resina Sintética

船用防水型プラグ・レセプタクル 水密电池及插座

#### (Ref. JIS F 8832, 8833)

Watertight type plug and receptacle with earthing contact for use on the circuits of lights and small electric appliances rated 250V or less. Synthetic resin made body will be furnished unless otherwise specified for materials such as cast iron or brass.

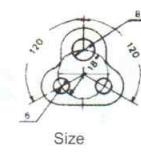
#### F8832-Plugs



1MA  
(79 28 01)



1MB  
(79 28 02)



Size

2MA  
(79 28 03)2MB  
(79 28 04)

Size

**How to order: CODE**

Plug, watertight, JIS F-8832, TYPES, STRAIGHT or ANGLE, NUMBER of PINS

| Unit Per Pcs. |      |               |                 |                |             |
|---------------|------|---------------|-----------------|----------------|-------------|
| CODE          | Type | Body Material | No. of Pin      | Rated Capacity |             |
| 79 28 01      | 1MA  | Straight      | Synthetic Resin | 3              | 250V 20 Amp |
| 02            | 1MB  | Angle         |                 |                |             |

| Unit Per Pcs. |      |               |                 |                |             |
|---------------|------|---------------|-----------------|----------------|-------------|
| CODE          | Type | Body Material | No. of Pin      | Rated Capacity |             |
| 79 28 03      | 2MA  | Straight      | Synthetic Resin | 4              | 250V 20 Amp |
| 04            | 2MB  | Angle         |                 |                |             |

Note: M denotes that the body is made of synthetic resin.  
A denotes straight plug.  
B denotes angle plug.

**F8833-Receptacles**1M  
(79 28 06)2M  
(79 28 07)S1MR  
(79 28 08)**How to order: CODE**

Receptacle, watertight, JIS F 8833, TYPE, NUMBER of PINS, WITHOUT or WITH SWITCH

| Unit Per Pcs. |      |                 |         |            |   |
|---------------|------|-----------------|---------|------------|---|
| CODE          | Type | Body Material   | Switch  | No. of Pin | Rated Capacity  |
| 79 28 06      | 1M   | Synthetic Resin | Without | 3          | 250V 15 Amp.  |
| 79 28 07      | 2M   |                 | Without | 4          |   |
| 79 28 08      | S1MR |                 | With    | 3          | 125V-DC 5 Amp.<br>125V-AC 10 Amp.<br>250V-DC 2 Amp.<br>250V-AC 5 Amp. |

Note: M denotes that the body is made of synthetic resin.  
S denotes the receptacle with a switch.  
R denotes with the internal switch of rotary type...

**Plug & Receptacle Sets**

Regarding aforementioned plug & receptacle, the following combinations are most commonly available.

**How to order: CODE**

Plug & receptacle set, watertight, TYPE of PLUG & RECEPTACLE, NUMBER of PINS

| CODE     | Combination of      |                           | No. of Pin | Unit Per Set |
|----------|---------------------|---------------------------|------------|--------------|
|          | F8832 Plug Type No. | F8833 Receptacle Type No. |            |              |
| 79 28 11 | 1MA (Straight)      | 1M (w/o Switch)           | 3          |              |
| 12       | 1MA (Straight)      | S1MR (w Switch)           | 3          |              |
| 13       | 1MB (Angle)         | 1M (w/o Switch)           | 3          |              |
| 14       | 1MB (Angle)         | S1MR (w Switch)           | 3          |              |
| 79 28 15 | 2MA (Straight)      | 2M (w/o Switch)           | 4          |              |
| 16       | 2MB (Angle)         | 2M (w/o Switch)           | 4          |              |

**Spare Interiors for Plug & Receptacle**

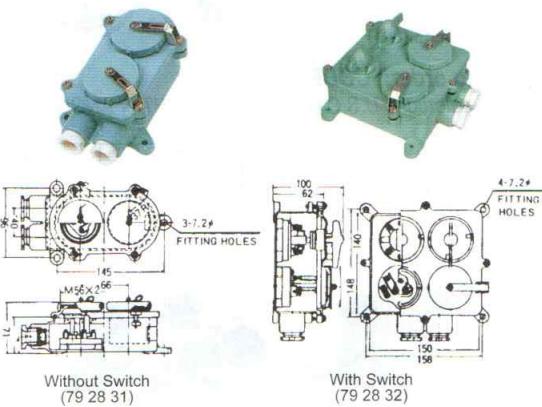
| CODE     | Interior | For              | Pin No. | Applicable Type No.   | Unit Per Pcs. |
|----------|----------|------------------|---------|---|---------------|
| 79 28 21 |          | Plug F8832       | 3       | 1MA Straight (79 28 01)<br>1MB Angle (79 28 02)             |               |
| 79 28 22 |          | "                | 4       | 2MA Straight (79 28 03)<br>2MB Angle (79 28 04)             |               |
| 79 28 23 |          | Receptacle F8833 | 3       | 1M without Switch (79 28 06)<br>S1MR with Switch (79 28 08) |               |
| 79 28 24 |          | Receptacle F8833 | 4       | 2M without Switch (79 28 07)                                |               |
| 79 28 25 |          | Switch F8833     | 3       | S1MR with Switch (79 28 08)                                 |               |

**Watertight 3-pin Twin Receptacles****Synthetic Resin**

Bases Dobles Estanca de 3-Pin / Resina Sintética

防水 3P 連結型レセプタクル 防水三销插座

Double receptacles to be used with watertight JIS 3 pin plugs.  
Main bodies are synthetic resin.

Without Switch  
(79 28 31)With Switch  
(79 28 32)

| CODE     | Type           | Pins | Rated Capacity                    | Unit Per Pcs. |
|----------|----------------|------|-----------------------------------|---------------|
| 79 28 31 | Without Switch | 3    | 250V 15A                          |               |
| 79 28 32 | With Switch    | 3    | 250V AC5A DC2A or 125V AC10A DC5A |               |

Note: Spare interiors of the above are exactly the same as formerly coded items of F8832, F8833.

## Watertight Plug & Twin Receptacle Sets

### Synthetic Resin

Clavija con 3-pin y Base Estanca

防水プラグ & ツインレセプタクルセット 防水三栓插头及插座

Combination of above twin receptacle with  
aforementioned F8832 plugs are as follows.

### How to order: CODE

Plug & twin receptacle set, watertight, TYPE of PLUG &  
RECEPTACLE, NUMBER of PINS

| CODE     | Combination of                           |   | No.of Pin | Unit Per Set |
|----------|--|---|-----------|--------------|
|          | Plug                                     | Receptacle                                      |           |              |
| 79 28 36 | Straight Plug<br>F8832-1MA<br>(79 28 01) | Twin Receptacle without<br>Switch<br>(79 28 31) | 3         |              |
| 79 28 37 | "  | Twin Receptacle with Switch<br>(79 28 32)       | 3         |              |
| 79 28 38 | Angle Plug<br>F8832-1MB<br>(79 28 02)    | Twin Receptacle without<br>Switch<br>(79 28 31) | 3         |              |
| 79 28 39 | "  | Twin Receptacle with Switch<br>(79 28 32)       | 3         |              |

## Watertight 3-pin Plugs & Receptacles

### Cast Iron

### U.S.C.G. R & S Type

Clavija con 3-Pin y Base Estanca/Hierro fundido

Tipo U.S.C.G. ys

米国式防水 3P プラグレセプタクル

美式防水 3P 插头插座

Cast iron receptacle box sealed with synthetic rubber packing  
and brass plug. Rated capacity is 250V, 10 amp. One 6.8  
mm and two 5.3 mm diameter pins on the plug.

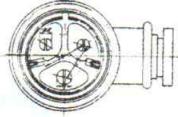
### Plugs



Straight



Angle



### How to order: CODE

Plug, watertight, U.S.C.G. 3-pin, STRAIGHT or ANGLE

| Unit Per Pcs. |          |      |          |
|---------------|----------|------|----------|
| CODE          | 79 28 51 | CODE | 79 28 52 |
| Type          | Straight | Type | Angle    |

### Receptacles



Without Switch



With Switch

### How to order: CODE

Receptacle, watertight, U.S.C.G. 3-pin, WITHOUT or WITH SWITCH

| Unit Per Pcs. |                |      |             |
|---------------|----------------|------|-------------|
| CODE          | 79 28 56       | CODE | 79 28 57    |
| Type          | Without Switch | Type | With Switch |

## Plug & Receptacle Sets

Above plug & receptacle combination.

### How to order: CODE

Plug & receptacle, watertight, 3-pin, U,S,C,G, R & S type, TYPE of PLUG and RECEPTACLE

| CODE     | Combination of      |                       | Unit Per Set |
|----------|---------------------|-----------------------|--------------|
|          | Plug                | Receptacle            |              |
| 79 28 61 | Straight (79 28 51) | W/o Switch (79 28 56) |              |
| 79 28 62 | Angle (79 28 52)    | "                     |              |
| 79 28 63 | Straight (79 28 51) | W/Switch (79 28 57)   |              |
| 79 28 64 | Angle (79 28 52)    | "                     |              |

## Spare Interiors for 3-pin Plug & Receptacle U.S.C.G. R & S Type

| CODE     | Interior | For        | Pin | Unit Per Pcs.  |  |
|----------|----------|------------|-----|--|--|
|          |          |            |     | Remark   |  |
| 79 28 66 |          | Plug       | 3   | U.S.C.G.<br>Straight or Angle<br>Type<br>(79 28 51 or<br>79 28 52) |  |
| 79 28 67 |          | Receptacle | 3   | U.S.C.G. with or<br>without Switch<br>(79 28 56 or<br>79 28 57)    |  |
| 79 28 68 |          | Switch     | 3   | U.S.C.G. Type<br>(79 28 57)  |  |

## Watertight 3-pin Plugs & Receptacles

### with Switch, Type HNA

Clavija con 3-Pin y Base Estanca con Interruptor, Tip HNA

HNA 式防水 3P プラグレセプタクル

HNA 型防水 3P 插头插座

Watertight marine use plug & receptacle with switch. Rated capacity is 250V, 10 amp. Available in cast brass or synthetic resin main body.



Plug

Receptacle with Switch

| CODE     | Type | Description                         |  | Unit |
|----------|------|-------------------------------------|--|------|
|          |      | Synthetic Resin                     |  |      |
| 79 28 81 | HNA  | Plug 3 Pin                          |  | Pc.  |
| 84       | "    | Plug 3 Pin with Self-locking        |  | "    |
| 82       | "    | Receptacle with Switch 3 Pin        |  | "    |
| 83       | "    | Plug & Receptacle with Switch 3 Pin |  | Set  |

| Cast Brass |     |   |  |     |
|------------|-----|---|--|-----|
| 79 28 86   | HNA | Plug 3 Pin                                |  | Pc. |
| 85         | "   | Plug 3 Pin with Self-locking              |  | "   |
| 87         | "   | Receptacle with Switch 3 Pin              |  | "   |
| 89         | "   | Receptacle with Self-locking Switch 3 Pin |  | "   |
| 88         | "   | Plug & Receptacle with Switch 3 Pin       |  | Set |

### Spare Interiors for 3-pin Plug & Receptacle HNA Type

| CODE     | Interior | For        | Pin | Unit Per Pcs. | Remark                                      |
|----------|----------|------------|-----|---------------|---|
| 79 28 91 |          | Plug       | 3   | UB (79 29 01) | HNA Type (79 28 81 or 79 28 86)             |
| 79 28 92 |          | Receptacle | 3   | I (79 29 05)  | HNA Type with Switch (79 28 82 or 79 28 87) |
| 79 28 93 |          | Switch     | 3   | IB (79 29 04) | HNA Type (79 28 82 or 79 28 87)             |



### Explosion Proof Plugs, Sockets and Switches

Enchufes, tomas e interruptores antideflagrantes

防爆型プラグ、ソケット、スイッチ 防爆插头、插座和开关

Brass made, designed to prevent sparks in hazardous environments, ensure safety during electrical connections in potentially explosive atmospheres.



Plug D socket L Socket Switch

#### Specifications

|                      |  |
|----------------------|--|
| Explosion Protection | Plug/Socket: Zone 1, II2G EEx ed IIC T6/T5<br>Switch: Zone 21,1, II2G EEx ed IIC T6/T5Gb,<br>II2D Ex tb IIIC T80° Db |
| IP                   | Plug/Socket: 56<br>Switch: 66  |
| Ambient Temperature  | Plug/Socket: -40°C up to +40°C: T6/<br>-40°C up to +55°C: T7<br>Switch: -40°C up to +55°C                            |
| Voltage              | Plug/Socket: max 415V, 50/60Hz<br>Switch: max 690V   |
| Rated Current        | 16A  |
| Switching Capacity   | 250V/16A: AC 3   |

Unit per Pcs.

| CODE     | Description   | Voltage    | Pole | H |
|----------|---------------|------------|------|---|
| 79 28 94 | Plug          |            |      |   |
| 79 28 95 | D Socket      | 220 - 250V | 3    | 6 |
| 79 28 96 | L Socket      |            |      |   |
| 79 28 97 | On-Off Switch | 690V (max) | -    | - |

### Non-Watertight Type Plugs & Receptacles

Clavija y Base Tipo No Estanca

船用非防水プラグ及びレセプタクル

船用无防水插头及插座

(Ref. JIS F 8831, 8835)

Non-watertight double pole plug & receptacle with a grounding contact for marine use. Used for lighting fittings and small electric apparatus. Made of phenol resin.

### Non-Watertight "Siemens" Cable Plugs & Receptacles with Earthing Contact

Clavija para Cable y Base No Estanca "Siemens" con Toma-Tierra  
シーメンズ型プラグ・レセプタクル

不防水 "Siemens" 电缆插塞及插座

Phenol resin round 2 pin plug with grounding and side entry for cabling. The pin diameter is 4.8 mm and the distance between pin center is 19.5 mm. Able to connect 250V, 10 amp. DC and 250V, 16 amp. AC.



Plug  
(79 29 21)

Single Receptacle  
(79 29 22)

Double Receptacle  
(79 29 23)

| CODE     | Description                                     | Unit |
|----------|---|------|
| 79 29 21 | Plug, 2 round pin "Siemens"                     | Pc.  |
| 79 29 22 | Receptacle single, 2 round pin "Siemens"        | Pc.  |
| 79 29 23 | Receptacle double, 2 round pin "                | "    |
| 79 29 24 | Plug & single receptacle, 2 round pin "Siemens" | Set  |
| 79 29 25 | Plug & double receptacle, 2 round pin "         | "    |

### Non-Watertight "Siemens" Distribution Plugs

Clavija Distribución No Estanca "Siemens", 3 Tomas

シーメンズ型三方レセプタクル 不防水 "Siemens" 分配插塞

Combination of 2 round pin plugs with 3 way receptacles. Rated capacity 250V, 10 amp. Made of phenol resin.



|          |   |     |
|----------|---|-----|
| 79 29 30 | Distribution plug "Siemens" phenol resin, 2 round pin | Pc. |
|----------|---|-----|

## Non-Watertight "Siemens" Cable Connectors

Clavija y Base Aérea, No Estanco "Siemens"

シーメンズ型電線コネクター "Siemens" 无防水电线接头

Rubber coated phenol resin 2 round pin plug and receptacle. Rated capacity 250V, 10 amp.



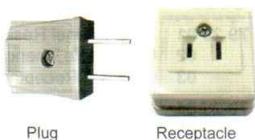
|          |   |     |
|----------|---|-----|
| 79 29 35 | Cable connector "Siemens" phenol resin, 2 round pin | Pr. |
|----------|---|-----|

## Non-Watertight 2-Flat Pin Cabin Plugs & Receptacles

### Phenol Resin

Calvija Macho 2 Pin Americana y Base Americana 2 Pin, No Estanco  
防水 2 フラットピンプラグ 无防水室内二平栓插头及插座

Phenol resin 2-flat pin for cabin use plug & receptacle.



| CODE     | Item              | Rating   | Unit |
|----------|-------------------|----------|------|
| 79 29 51 | Plug, 2 flat pin  | 125V 15A | Pc.  |
| 52       | Receptacle        | 250V 15A | "    |
| 53       | Plug & receptacle | -        | Pr.  |

## Plug & Receptacle Adaptors

Adaptadores Clavija y Base Europea/Americana

プラグアダプター 插头及插座承接器

Non-watertight plug & receptacle adapters for cabin use. Available various types of adaptors to convert power outlet to other countries when traveling, as shown below.

| CODE     | External Appearance | Conversion | Rating    |
|----------|---------------------|------------|-----------|
| 79 29 61 | A Type              | B/C/SE → A | 10A, 250V |
| 79 29 62 | C Type              | A/B/SE → C | 10A, 250V |
| 79 29 54 | B Type              | A/C/SE → B | 10A, 250V |

Unit Per Pcs.

| CODE     | External Appearance | Conversion              | Rating    |
|----------|---------------------|-------------------------|-----------|
| 79 29 55 | O Type              | A/B/C/SE → O            | 10A, 250V |
| 79 29 56 | SE Type             | A/B/C → SE              | 10A, 250V |
| 79 29 57 | BF Type             | A/B/C/ O/SE/ B3/O2 → BF | 13A, 250V |
| 79 29 58 | B3 Type             | A/B/C/ O/SE/ BF/O2 → B3 | 10A, 250V |
| 79 29 59 | O2 Type             | A/B/C/ O/SE/ BF/B3 → O2 | 10A, 250V |
| 79 29 60 | A Type              | B/C/O/ SE/BF B3/O2 → A  | 10A, 250V |

## Multiway Receptacles with Cord and Plug

Receptáculo de Multientrada con Cable y Tapón

電源タップ 多孔插座延長線

Electric receptacles with extension cord for all portable equipments to help you place them in the best indoor locations. Please specify the type of plugs and length of extension cable when ordering.



Unit Per Pcs.

| CODE | Number of Receptacles | Length of Cord | CODE | Number of Receptacles | Length of Cord |
|------|-----------------------|----------------|------|-----------------------|----------------|
|------|-----------------------|----------------|------|-----------------------|----------------|

### European Plug (2 Round Pins)

|          |        |       |          |        |       |
|----------|--------|-------|----------|--------|-------|
| 79 29 63 | 2 ways | 3 mtr | 79 29 67 | 4 ways | 3 mtr |
| 64       |        | 5 "   | 68       |        | 5 "   |
| 79 29 65 | 3 ways | 3 mtr | 69       |        | 7 "   |
| 66       |        | 5 "   | 70       |        | 10 "  |

### British Plug (3 Flat Pins)

|          |        |       |          |        |       |
|----------|--------|-------|----------|--------|-------|
| 79 29 82 | 2 ways | 3 mtr | 79 29 88 | 4 ways | 3 mtr |
| 83       |        | 5 "   | 89       |        | 5 "   |
| 79 29 84 | 3 ways | 3 mtr | 90       |        | 7 "   |
| 85       |        | 5 "   | 91       |        | 10 "  |

| Unit Per Pcs.                                  |                       |                |                            |                       |                |
|--|-----------------------|----------------|----------------------------|-----------------------|----------------|
| CODE   | Number of Receptacles | Length of Cord | CODE                       | Number of Receptacles | Length of Cord |
| <b>U.S.A./ Japanese (2 Flat Pins)</b>          |                       |                |                            |                       |                |
| 79 29 92<br>93                                 | 2 ways                | 3 mtr<br>5 "   | 79 29 96<br>97<br>98<br>99 | 4 ways                | 3 mtr<br>5 "   |
| 79 29 94<br>95                                 | 3 ways                | 3 mtr<br>5 "   |                            |                       | 7 "<br>10 "    |
| <b>Multi Plug (2 Round/3 Flat/2 Flat Pins)</b> |                       |                |                            |                       |                |
| 79 29 45<br>46                                 | 3 ways                | 3 mtr<br>5 "   | 79 29 49<br>50             | 5 ways                | 3 mtr<br>5 "   |
| 79 29 47<br>48                                 | 4 ways                | 3 mtr<br>5 "   |                            |                       |                |

## Cabin Flush Receptacles

Receptáculos empotrados en cabina

埋込コンセント 机舱内の冲洗式插座

Cabin flush receptacles for various pin plugs with U type grounding outlet. Finished with a plastic ivory coloured plate. Able to connect up to 125V, 15 amp.

### How to order: CODE

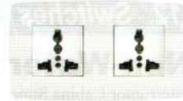
Receptacle, cabin flush, PIN TYPE, NOS OF GANG, AMPERE VOLTAGE

| Unit Per Pcs. |                   |           |             |
|---------------|-------------------|-----------|-------------|
| CODE          | Series            | Pin Type  | Rating      |
| 79 29 73      | 1 Gang,<br>2P + E | JIS       | 15A, 125V   |
| 79 29 07      |                   | BS        | 13A, 240VAC |
| 79 29 08      |                   | Schuko    | 16A, 250VAC |
| 79 29 09      |                   | Universal | 13A, 250VAC |
| 79 29 74      | 1 Gang,<br>2P + E | JIS       | 15A, 125V   |
| 79 29 10      |                   | BS        | 13A, 240VAC |
| 79 29 11      |                   | Schuko    | 16A, 250VAC |
| 79 29 12      |                   | Universal | 13A, 250VAC |

## Cabin Surface Receptacles

Receptáculos de superficie de cabina 露出コンセント 船舱表面垃圾箱

Plastic & bakelite surface receptacle for various pin plug. Can be used as a temporary extension receptacle from the flush receptacle by connecting a cord.



| Unit Per Pcs.              |                |                                  |             |
|----------------------------|----------------|----------------------------------|-------------|
| CODE                       | Series         | Pin Type                         | Rating      |
| 79 29 76<br>77<br>78<br>79 | 1 Gang, 2P + E | 1 Gang, 2P + E                   | 125V, 15A   |
|                            |                | 2 Gang, 2P + E                   |             |
|                            |                | 3 Gang, 2P + E                   |             |
|                            |                | 4 Gang, 2P + E                   |             |
| 79 29 13<br>14             | BS             | 1 Gang, 2P + E<br>2 Gang, 2P + E | 13A, 240VAC |
| 79 29 15<br>16             | Schuko         | 1 Gang, 2P + E<br>2 Gang, 2P + E | 16A, 250VAC |
| 79 29 17<br>18             | Universal      | 1 Gang, 2P + E<br>2 Gang, 2P + E | 13A, 250VAC |

## 2-Flat Pin 3 Way Receptacles

Clavija Americana Ladrón 3 Tomas

三方レセプタクル 2 平销 3 向插座

2 flat pin 3 way receptacle with a one way plug. Rated capacity is 125V, 10 amp.

|          |   |     |
|----------|---|-----|
| 79 29 81 | 2 flat pin 3 way receptacle with one way plug | Pc. |
|----------|---|-----|



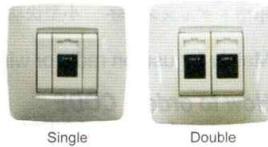
## Data Sockets

Salida para cables de comunicación

通信ケーブル用コンセント 通信电缆插座

### CAT 6. Data Sockets for Lan Cable

Flush type CAT 6. Data socket for LAN cables. Available in single or double socket.



Single      Double

Unit Per Pcs.

| CODE           | Type         | Socket No.       | Size mm |      |
|----------------|--------------|------------------|---------|------|
|                |              |                  | H       | W    |
| 79 29 26<br>27 | Flush Socket | Single<br>Double | 89.9    | 89.9 |

## USB Outlet Sockets

Flush type double USB outlet socket. 110-240 VAC, 5 VDC, 2.1A.



|          |                                       |     |
|----------|---------------------------------------|-----|
| 79 29 28 | USB double outlet socket, 110-240 VAC | Pc. |
|----------|---------------------------------------|-----|

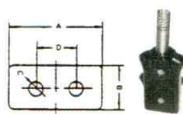
## Iron Plugs

Clavijas para Plancha アイロン用プラグ 电熨斗插头

Heat resistant synthetic resin plugs. Furnished in a round pin type.

### How to order : CODE

Iron plug, VOLTAGE, AMPERE



Unit Per Pcs.

| CODE           | Rating  |         | Size mm  |          |        |          |
|----------------|---------|---------|----------|----------|--------|----------|
|                | Voltage | Ampere  | A        | B        | C      | D        |
| 79 29 86<br>87 | 250     | 6<br>15 | 30<br>40 | 15<br>20 | 6<br>7 | 15<br>20 |

## 12. Switches

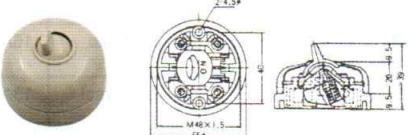
### Non-Watertight Snap Switches

Interruptor Cabina Superficie Redondo, No Estanco

船用非防水型小型スイッチ 不防水快动开关

(Ref. JIS F 8840)

Non-watertight type snap switches with toggle type knob used for circuits, light fittings and small electric fittings. The rated voltage is 250V or less, DC10A and AC20A or less. Made of phenol resin. T denotes Toggle Knob type.



**How to order: CODE**

Snap switch, non-watertight, TYPE, NUMBER of POLES, SIZE, RATED CAPACITY

| CODE     | Type | No. of Pole | Size mm |    | Rate Capacity |    |        | Unit Per Pcs. |    |    |
|----------|------|-------------|---------|----|---------------|----|--------|---------------|----|----|
|          |      |             | D       | H  | V             |    | Ampere |               | DC | AC |
|          |      |             |         |    | 125           | 5  | 10     | 250           |    |    |
| 79 30 01 | 1T   | 2           | 56      | 30 | 125           | 5  | 10     | 250           | 2  | 5  |
| 79 30 02 | 2T   | 2           | 64      | 40 | 125           | 10 | 20     | 250           | 5  | 10 |

### Small Snap Switches

Interruptores de Bola

小型トグルスイッチ 小型快动开关

Mainly for use on radio or wireless operations.

**How to order: CODE**

Snap switch, TYPE of CIRCUIT, RATED CAPACITY



Unit Per Pcs.

| CODE     | Circuit |       | Rated Capacity | Action | Case Size mm |      |      | Unit Per Pcs. |
|----------|---------|-------|----------------|--------|--------------|------|------|---------------|
|          | Pole    | Throw |                |        | L            | W    | D    |               |
| 79 30 06 | 2       | 1     | AC125V, 5A     | ON-OFF | 27.8         | 17.6 | 22.9 |               |
| 07       | 2       | 2     | AC125V, 5A     | ON-OFF | 27.8         | 17.6 | 22.9 |               |
| 08       | 1       | 1     | AC125V, 3A     | ON-OFF | 25.5         | 13.2 | 15   |               |
| 09       | 2       | 1     | AC125V, 25A    | ON-OFF | 33.2         | 19   | 25.1 |               |

### Marine Watertight Type Small Rotary Switches

Interruptores Estanco Polia-Mida

船用防水小型スイッチ 船用防水小型转动式开关

(Ref. JIS F 8841)

Watertight small switch used on board for lighting and small electric fittings of a rated voltage 250V or less.

Made of synthetic resin and cast iron. Single switch with one inlet and outlet gland.



**How to order: CODE**

Rotary switch, watertight, TYPE, NUMBER of POLES, SIZE, RATED CAPACITY

| CODE     | Type | No. of Pole | Size mm |     |    | Rated Capacity |    |    |
|----------|------|-------------|---------|-----|----|----------------|----|----|
|          |      |             | D       | P   | H  | V              | DC | AC |
|          |      |             |         |     |    | 125            | 5  | 10 |
| 79 30 14 | 1R   |             | 74      | 110 | 68 | 250            | 2  | 5  |
|          |      |             |         |     |    | 125            | 5  | 10 |
| 70 30 15 | 1MR  |             | 84      | 120 | 78 | 250            | 2  | 5  |
|          |      |             |         |     |    | 125            | 10 | 20 |
| 70 30 16 | 2R   |             | 84      | 120 | 78 | 125            | 10 | 20 |
|          |      |             |         |     |    | 250            | 5  | 10 |
| 70 30 17 | 2MR  |             |         |     |    |                |    |    |

Remark: Symbol R indicates Cast Iron Rotary Switch.

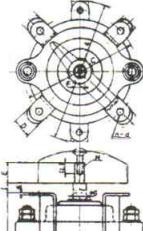
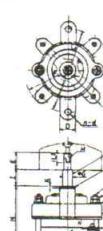
Symbol M indicates that the body cover and handle are synthetic resin.

### Rotary Switches

Commutadores 回転スイッチ 船用转动式开关

(Ref. JIS F8845-1996)

Marine rotary switches used to change over the resistance circuit, lamp circuit and indication circuit (excluding electric motors) in electric apparatus.



R1, R2

R3, R4

**How to order: CODE**

Rotary switch, TYPE of CIRCUIT, NUMBER of POLES, SIZE, RATED CAPACITY

| CODE     | Type | Switch Rotating Angle | Circuit | No. of Pole | Unit Per Pcs. |     |
|----------|------|-----------------------|---------|-------------|---------------|-----|
|          |      |                       |         |             | Voltage       | Amp |
| 79 30 28 | R1   |                       | Off     | 1 - 8       | AC, DC 250    | 6   |
|          |      |                       |         |             | AC, DC 125    | 12  |
|          |      |                       | On      | 1 - 8       | AC, DC 250    | 10  |
|          |      |                       |         |             | AC, DC 125    | 20  |
| 79 30 46 | R3   |                       | 60°     | 1 - 6       | AC, DC 250    | 30  |
|          |      |                       |         |             | AC, DC 125    | 45  |
| 79 30 54 | R4   |                       |         | 1 - 4       | AC, DC 250    | 60  |

Remarks: The symbol of Type R denotes the rotary switch, and classified into R1, R2, R3, and R4 according to the rated capacity of the switch.

### Cabin Flush Toggle Switches

Interruptores Empotrables de Cabina

埋込トグルスイッチ 室内埋式纽扣开关



Available in single and double type with phenol resin plate.

| CODE     | Switch No. | Size mm |     |    | Rated Capacity                           |
|----------|------------|---------|-----|----|--|
|          |            | H       | W   | D  |  |
| 79 30 61 | Single     | 115     | 82  | 48 | 125V DC5A AC 10A<br>or<br>250V DC2A AC5A |
|          | Double     | 115     | 144 | 48 |  |

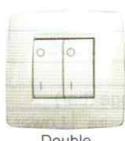
### Cabin Switches

Interruptores de cabina キャビンスイッチ 机舱开关

Available in single and double type with phenol resin plate.



Single



Double

Unit Per Pcs.

| CODE           | Type           | Switch No.    | Size mm |      | Rated Capacity       |
|----------------|----------------|---------------|---------|------|----------------------|
|                |                |               | H       | W    |                      |
| 79 30 63<br>64 | Flush Switch   | Single Double | 89.9    | 89.9 | 250V, 16A<br>2 Poles |
| 79 30 65<br>70 | Surface Switch | Single Double | 89.9    | 89.9 |                      |

## Push Button Switches

### Non-Watertight

Pulsadores de Pared Marcha /Paro  
船用押ボタン 用于船舶的按钮

(Ref. JIS F 8503)

Used for intercommunication and alarm systems on board.  
Made of phenol resin.

Rating capacity: 125V, 1 amp.  
250V, 0.5 amp.



1S



1FA-1FB



2S

Unit Per Pcs.

| CODE     | Type | Size mm     |   |     |    | Remark         |
|----------|------|-------------|---|-----|----|----------------|
|          |      | Flush Depth | Φ | L   | W  |                |
| 79 30 66 | 1S   | 56          |   |     |    |                |
| 67       | 1FA  | 36          |   |     |    | Non Watertight |
| 68       | 1FB  | 43          |   | 115 | 72 |                |
| 79 30 69 | 2S   | 70          |   |     |    | Watertight     |

Remark: Type 1 denotes non-watertight type.

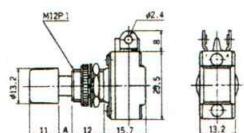
Type 2 denotes watertight type.

S denotes surface type, Type FA flush type of 36 mm in depth, Type FB flush type of 43 mm in depth.

## Small Push Button Switches

Pulsadores Bola 小型押ボタンスイッチ 小型按扭开关

Push button switches for cabin use. Non-watertight. Rating capacity AC 125V 3 amp. or AC 250V 1.5 amp.



79 30 74

Switch, push button, non watertight on-off, case size 13.2 x 25.5 x 15.7 mm

Pcs.

## Push Button Switches

Pulsadores プッシュスイッチ 按钮开关

ABS resin outer casing surface switch for use as an on-off switch for motors, etc.

**How to order: CODE**

Push button switch, TYPE of FITTING, RATING



| CODE                      | Rating | Applicable Motor Capacity |     |      | Outer Size mm<br>L x W x D |
|---------------------------|--------|---------------------------|-----|------|----------------------------|
|                           |        | Phase                     | V   | KW   |                            |
| <b>Surface Type</b>       |        |                           |     |      |                            |
| 79 30 76                  | 2P 15A | 1Φ                        | 110 | 0.4  | 80 x 38 x 40               |
| 79 30 77                  | 3P 15A | 3Φ                        | 220 | 2.2  | 80 x 38 x 40               |
| 79 30 78                  | 2P 30A | 1Φ                        | 110 | 0.75 | 90 x 45 x 44               |
| 79 30 79                  | 3P 30A | 3Φ                        | 220 | 3.7  | 90 x 45 x 44               |
| <b>Weather Proof Type</b> |        |                           |     |      |                            |
| 79 30 81                  | 2P 15A | 1Φ                        | 110 | 0.4  | 162 x 66 x 74              |
| 79 30 82                  | 3P 15A | 3Φ                        | 220 | 2.2  | 162 x 66 x 74              |
| 79 30 83                  | 3P 30A | 3Φ                        | 220 | 3.7  | 186 x 80 x 74              |

## Push Button Switches for Hoist

Botonera para Polea

ホイスト用プッシュスイッチ 吊车用按扭开关

Weather proofed suspension type switch made of ABS resin. Motor direct control and indirect control with AC starter types are available.

**How to order: CODE**Push button switch for hoist, TYPE of CONTROL,  
BUTTON NUMBERS

Unit Per Pcs.

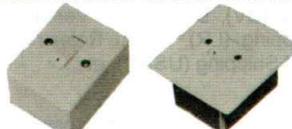
| Type                           | Direct Control               |                       | Indirect Control   |                     |
|--------------------------------|------------------------------|-----------------------|--------------------|---------------------|
| CODE                           | 79 30 85                     | 79 30 86              | 79 30 87           | 79 30 88            |
| Button Nos.                    | 2                            | 6                     | 2                  | 6                   |
| Operation                      | Up Down                      | Up Down<br>4 Quarters | Up Down            | Up Down<br>Quarters |
| Rating                         | 3Φ200/220V<br>400/440V 2.2KW |                       | 250V 5A<br>500V 2A |                     |
| Applicable<br>Cable Size<br>mm | 15.4 - 16.6                  | 14.3 - 15.5           | 11.4 - 12.6        | 17.2 - 18.4         |

## Non-Watertight Seesaw Switches

Interruptores de Vaiven Antiherméticos

シーソースイッチ 无防水跷板式开关

Synthetic resin cabin seesaw switches. Non-watertight. Available in surface and flush mounted types.



Surface



Flush

Unit Per Pcs.

| CODE     | Type           | Rating   | Size mm       |
|----------|----------------|----------|---------------|
| 79 30 91 | Single Surface | 250V 10A | 65 x 52 x 39  |
| 92       | Single Flush   |          | 89 x 82 x 53  |
| 93       | Double Flush   |          | 132 x 39 x 51 |

## Dimmer Switches

Regulador Luz o Filtro Amortiguador

ディマースイッチ 減光器开关

For adjusting the lights of the incandescent lamp from bright to candle glow without flickering or steps.

When ordering, please specify the power source voltage and wattage of the applicable lamp.

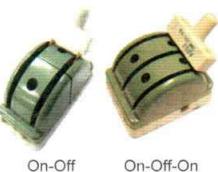
**How to order: 79 - 30 - 96**

Dimmer switch, power source voltage, wattage of the lamp (Pcs.)

## Knife Switches

Interruptores de Cuchilla ナイフスイッチ

Porcelain and synthetic resin rating 30 to 100 amperes, AC 250 volts. Used for switchboards, testing equipment, battery insulation, welders, etc., where no heavy duty service is required.



On-Off      On-Off-On

### How to order: CODE

Knife switch, NUMBER of POLES, TYPE, AMPERE

Unit Per Pcs.

| 2-Pole   |           |     |         | 3-Pole   |           |     |         |
|----------|-----------|-----|---------|----------|-----------|-----|---------|
| CODE     | Type      | Amp | Fuse    | CODE     | Type      | Amp | Fuse    |
| 79 31 01 | On-Off-On | 30  | No Fuse | 79 31 06 | On-Off-On | 30  | No Fuse |
| 02       | "         | 60  | "       | 07       | "         | 60  | "       |
| 03       | On-Off    | 30  | Fusible | 08       | On-Off    | 30  | Fusible |
| 04       | "         | 60  | "       | 09       | "         | 60  | "       |
| 05       | "         | 100 | "       | 10       | "         | 100 | "       |

## Pressure Switches

Presostatos 壓力スイッチ 压力开关

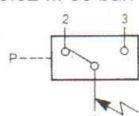
For opening or closing circuit at a set point within the adjusting range, operated by increasing or decreasing pressure. There are models actuated by diaphragm, piston, etc. The most common models are described below for your reference. Please ask for further information and brochures of various manufacturers and models available from local suppliers when required.



Switching function:  
Microswitch SPDT  
Terminals 1-3: Contacts close on rising pressure  
Terminals 1-2: Contacts open on rising pressure

### Diaphragm Actuated

For neutral gaseous and liquid fluids. Switching pressure range 0.02 ... 30 bar.



- Pressure switches for air, gas, water, hydraulic oil, lubricating oil, light fuel oil.
- Working viscosity up to 1,000 mm<sup>2</sup>/s.

Small size and preferred for pressure monitoring. Sealed design permits setting of differential switching points during operation without tools. Approved by shipping authorities, including, Bureau Veritas (BV), Det Norske Veritas (DNV), Lloyd's Register of Shipping (LR), Polski Rejestr Statków (PRS), USSR Register of Shipping (USSR), etc..

Repeatability

±2%

Switch Element

Microswitch

Protection Class

IP64

Ambient Temperature

-10 to + 80°C

Fluid Temperature

0 to +80°C

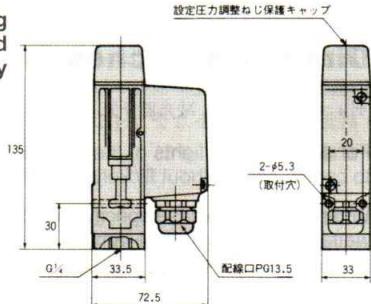
Max. Temperature at Switching Element

+80°C

Mounting Position

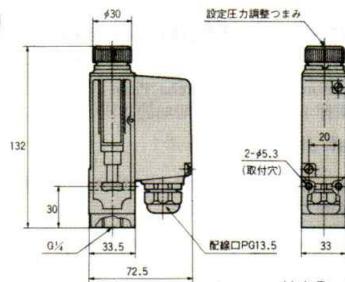
Optional

### Setting of switching point by allen head screw protected by plastic cover



| CODE                          | 79 31 51    | 79 31 52        | Unit Per Pcs. |
|-------------------------------|-------------|-----------------|---------------|
| Type No.                      | 0820150     | 0820750         |               |
| Adjustable Range (bar)        | 0.2 to 12   | 0.5 to 30       |               |
| Switching Pressure            | Lower Range | 0.9             | 1             |
| Difference (bar)              | Upper Range | 1.4             | 2             |
| Max. Allowable Pressure (bar) |             | 50              |               |
| Switching Cycles/Minutes      |             | Max. 60         |               |
| Pressure Sensor               | Housing     | Aluminium       |               |
| Materials                     | Seal        | NBR (Perbunan)  |               |
| Type of Connection            |             | Internal thread |               |
| Connection                    |             | G 1/4           |               |
| Total Weight (kg)             |             | 0.4             |               |
| Name of Mfr.                  |             | Herion-Werke KG |               |

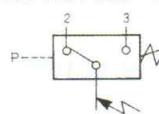
### Setting of switching point by scaled rotary button



| CODE                          | 79 31 53    | 79 31 54        | Unit Per Pcs. |
|-------------------------------|-------------|-----------------|---------------|
| Type No.                      | 0820160     | 0820760         |               |
| Adjustable Range (bar)        | 0.2 to 12   | 0.5 to 30       |               |
| Switching Pressure            | Lower Range | 0.9             | 1             |
| Difference (bar)              | Upper Range | 1.4             | 2             |
| Max. Allowable Pressure (bar) |             | 50              |               |
| Switching Cycles/Minutes      |             | Max. 60         |               |
| Pressure Sensor               | Housing     | Aluminium       |               |
| Materials                     | Seal        | NBR (Perbunan)  |               |
| Type of Connection            |             | Internal thread |               |
| Connection                    |             | G 1/4           |               |
| Total Weight (kg)             |             | 0.4             |               |
| Name of Mfr.                  |             | Herion-Werke KG |               |

### Piston Actuated

For neutral gaseous and liquid fluids. Switching pressure range 0.02 ... 30 bar. With soft seal, no leakage.



Switching function:  
Microswitch SPDT  
Terminals 1-3: Contacts close on rising pressure  
Terminals 1-2: Contacts open on rising pressure

- For oil-treated compressed air, hydraulic oil and other fluids with good antifriction properties (state kind of fluid).
- Working viscosity up to 1,000 mm<sup>2</sup>/s.

Small design and provided with scale for easy adjustment of switching points even during operation. Design with glydring seal for application in temperatures below 0 °C. Approved by shipping authorities, including Bureau Veritas (BV), Det Norske Veritas (DNV), Lloyd's Register of Shipping (LR), Polski Rejestr Statków (PRS), USSR Register of Shipping (USSR), etc..

Repeatability

±2%

Switching Element

Microswitch

Protection Class

IP 54

Ambient Temperature

0 to +80°C

(Grooved ring seal)

-20 to 80°C (Glydring seal)

Fluid Temperature

0 to 80°C

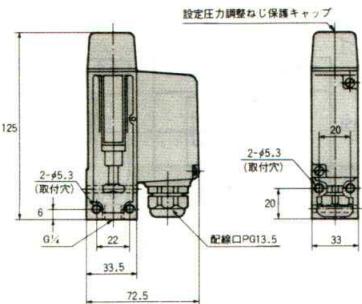
Max. Temperature at Switching Element

+80°C

Mounting Position

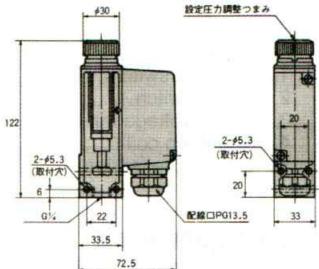
Urgent

Switching pressure difference not adjustable. Setting of switching point by screw with hex. recessed hole protected by plastic cover.



| CODE                                | 79 31 56                   | 79 31 57   | Unit Per Pcs. |
|-------------------------------------|----------------------------|--|---------------|
| Type No.                            | 0821051                    | 0821050  |               |
| Adjustable Range (bar)              | 5 to 70                    | 10 to 160  |               |
| Switching Pressure Difference (bar) | Lower Range<br>Upper Range | 7<br>12  | 9<br>18       |
| Max. Allowable Pressure (bar)       |                            | 250  |               |
| Switching Cycles/Minutes            |                            | Max. 20  |               |
| Pressure Sensor Materials           | Housing<br>Seal<br>Piston  | Aluminium<br>NBR (Perburunan)<br>Stainless Steel |               |
| Type of Connection                  |                            | Internal thread                                  |               |
| Connection                          |                            | G 1/4  |               |
| Total Weight (kg)                   |                            | 0.4  |               |
| Name of Mfr.                        |                            | Herion-Werke KG                                  |               |

Setting of switching point by scaled rotary button



| CODE                                | 79 31 58                   | 79 31 59   | Unit Per Pcs. |
|-------------------------------------|----------------------------|--|---------------|
| Type No.                            | 0821061                    | 0821060  |               |
| Adjustable Range (bar)              | 5 to 70                    | 10 to 160  |               |
| Switching Pressure Difference (bar) | Lower Range<br>Upper Range | 7<br>12  | 9<br>18       |
| Max. Allowable Pressure (bar)       |                            | 250  |               |
| Switching Cycles/Minutes            |                            | Max. 20  |               |
| Pressure Sensor Materials           | Housing<br>Seal<br>Piston  | Aluminium<br>NBR (Perburunan)<br>Stainless Steel |               |
| Type of Connection                  |                            | Internal thread                                  |               |
| Connection                          |                            | G 1/4  |               |
| Total Weight (kg)                   |                            | 0.4  |               |
| Name of Mfr.                        |                            | Herion-Werke KG                                  |               |

## 13. Circuit Breakers & Transformers

### Switching Power Supplies

Interruptores de Suministro de Energía パワーソース 压力开关

For supplying a stabilized power source converting from AC100 volt or AC200 volt to weak DC voltage, and suitable for use as power sources in the control panel for valve operation, etc. Available output power ranges from 10 watt to 600 watt.



| CODE                  | Model        | Output Volt & Amp | Input Voltage | Size mm W × L × H | Weight grm |
|-----------------------|--------------|-------------------|---------------|-------------------|------------|
| <b>Power 15 watt</b>  |              |                   |               |                   |            |
| 79 32 11              | HWS15A-5/A   | DC 5V, 3A         | AC85-265V     | 26.5×82×80        | 160        |
| 12                    | HWS15A-12/A  | DC12V, 1.3A       | AC85-265V     | 26.5×82×80        | 160        |
| 13                    | HWS15A-15/A  | DC15V, 1A         | AC85-265V     | 26.5×82×80        | 160        |
| 14                    | HWS15A-24/A  | DC24V, 0.65 A     | AC85-265V     | 26.5×82×80        | 160        |
| <b>Power 50 watt</b>  |              |                   |               |                   |            |
| 79 32 31              | HWS50A-5/A   | DC 5V, 10A        | AC85-265V     | 26.5×82×120       | 260        |
| 32                    | HWS50A-12/A  | DC 12V, 4.3A      | AC85-265V     | 26.5×82×120       | 260        |
| 33                    | HWS50A-15/A  | DC 15V, 3.5A      | AC85-265V     | 26.5×82×120       | 260        |
| 34                    | HWS50A-24/A  | DC 24V, 2.2A      | AC85-265V     | 26.5×82×120       | 260        |
| 35                    | HWS50A-48/A  | DC 48V, 1.1A      | AC85-265V     | 26.5×82×120       | 260        |
| <b>Power 75 watt</b>  |              |                   |               |                   |            |
| 79 32 41              | HWS80A-5/A   | DC 5V, 16A        | AC85-265V     | 28x82x160         | 420        |
| 42                    | HWS80A-12/A  | DC 12V, 6.7A      | AC85-265V     | 28x82x160         | 420        |
| 43                    | HWS80A-15/A  | DC 15V, 5.4A      | AC85-265V     | 28x82x160         | 420        |
| 44                    | HWS80A-24/A  | DC 24V, 3.4A      | AC85-265V     | 28x82x160         | 420        |
| 45                    | HWS80A-48/A  | DC 48V, 1.7A      | AC85-265V     | 28x82x160         | 420        |
| <b>Power 100 watt</b> |              |                   |               |                   |            |
| 79 32 51              | HWS100A-5/A  | DC 5V, 20A        | AC85-265V     | 28x82x160         | 420        |
| 52                    | HWS100A-12/A | DC 12V, 8.5A      | AC85-265V     | 28x82x160         | 420        |
| 53                    | HWS100A-15/A | DC 15V, 7A        | AC85-265V     | 28x82x160         | 420        |
| 54                    | HWS100A-24/A | DC 24V, 4.5A      | AC85-265V     | 28x82x160         | 420        |
| 55                    | HWS100A-48/A | DC 48V, 2.1A      | AC85-265V     | 28x82x160         | 420        |
| <b>Power 150 watt</b> |              |                   |               |                   |            |
| 79 32 62              | HWS150A-5/A  | DC 5V, 30A        | AC85-265V     | 37x82x160         | 470        |
| 63                    | HWS150A-12/A | DC 12V, 13A       | AC85-265V     | 37x82x160         | 470        |
| 64                    | HWS150A-15/A | DC 15V, 10A       | AC85-265V     | 37x82x160         | 470        |
| 65                    | HWS150A-24/A | DC 24V, 6.5A      | AC85-265V     | 37x82x160         | 470        |
| <b>Power 300 watt</b> |              |                   |               |                   |            |
| 79 32 82              | HWS300-5     | DC 5V, 60A        | AC85-265V     | 61x82x165         | 1,000      |
| 83                    | HWS300-12    | DC 12V, 27A       | AC85-265V     | 61x82x165         | 1,000      |
| 84                    | HWS300-15    | DC 15V, 22A       | AC85-265V     | 61x82x165         | 1,000      |
| 85                    | HWS300-24    | DC 24V, 14A       | AC85-265V     | 61x82x165         | 1,000      |
| 86                    | HWS300-48    | DC 48V, 7A        | AC85-265V     | 61x82x165         | 1,000      |
| <b>Power 600 watt</b> |              |                   |               |                   |            |
| 79 32 92              | HWS600-5     | DC 5V, 120A       | AC85-265V     | 100x82x165        | 1,600      |
| 93                    | HWS600-12    | DC 12V, 53A       | AC85-265V     | 100x82x165        | 1,600      |
| 94                    | HWS600-15    | DC 15V, 43A       | AC85-265V     | 100x82x165        | 1,600      |
| 95                    | HWS600-24    | DC 24V, 24A       | AC85-265V     | 100x82x165        | 1,600      |
| 96                    | HWS600-48    | DC 48V, 13A       | AC85-265V     | 100x82x165        | 1,600      |

## Circuit Breakers

Interruptores automáticos サーキットブレーカー 断路器

Used for the protection of circuits and electrical equipment. Capable of starting or halting current automatically to avoid damage to equipment due to circuit overload or short circuits.

Circuit breakers are mainly classified and selected according to rated current and rated breaking capacity of the circuit and where it is used.

The following matters should be specified when ordering circuit breakers.

### 1. Manufacturer name and model number.

With this information the rated breaking capacity of the circuit can be found.

### 2. No. of poles:

- a) 2 pole (Usually used with branched circuits)
- b) 3 pole (Usually used for marine circuits)
- c) 4 pole (Usually used in industrial plants)

### 3. Frame size:

ex. 30A, 50A, 100A, 225A, 400A, 600A.

If the type or model number is understood, this information will not be necessary.

### 4. Rated current (Trip current)

This current value is usually smaller than the frame size.

| ex. Frame size | Rated current      |
|----------------|--------------------|
| 30A            | 10A, 15A, 20A, 30A |
| 50A            | 10A ~ 50A          |
| 60A            | 10A ~ 60A          |
| 100A           | 10A ~ 100A         |

If the breaker is only instantaneous trip type, the value of the instantaneous trip current should be specified.

## 5. Method of mounting

### a) Front connected type (FC)

- Cable or busbars are connected directly to the terminal or breaker from the front side and the breaker is fitted directly to the rear iron frame.
- This type is seldom used for marine use. This type may only be used with a branch circuit and is not usually used in Main Switchboards.
- Normally used for industrial purposes.

### b) Rear-connected type (RC)

- Cable or busbars are connected directly to the rear terminal or the breaker on the rear side. This type cannot be fitted directly to the front side because the breaker is fitted directly to the rear iron frame.
- This type is seldom used for marine use but is still used more often than the Front - connected type.

### c) Plug in type (PM)

Cable or busbars are connected to the mounting base of the breaker, not directly to the breaker. In this way, the breaker itself can be removed from the mounting base without disconnecting the cable or busbars. This type is therefore most used for marine purposes.

## 6. Accessories

Accessories are sometime fitted to the breaker depending on the systems and functions of the equipment they are used in.

### 1. Auxiliary switch (Ax. Sw.)

Auxiliary switch opens or closes corresponding to the opening or closing of the circuit breaker. If the auxiliary switch is fitted in the breaker, the following information is required when ordering.

- One normal open contact
- One normal closed contact
- One normal and closed common contact
- Two normal open contacts
- Two normal closed contacts
- Two normal and closed common contacts

### 2. Alarm switch (Al. Sw.)

Alarm switch opens or closes when the breaker trips.

If the alarm switch is fitted to the breaker, the following-information is required when ordering.

- one normal open contact
- one normal closed contact
- others (Please specify how many open or closed contacts there are)

### 3. Under voltage trip coil

When the circuit voltage to the breaker is insufficient, the breaker trips automatically.

If the under voltage trip coil is fitted to the breaker, information about the voltage and frequency to the coil itself is needed:

AC or DC \_\_\_\_\_ V, \_\_\_\_\_ Hz.

### 4. Shunt trip coil

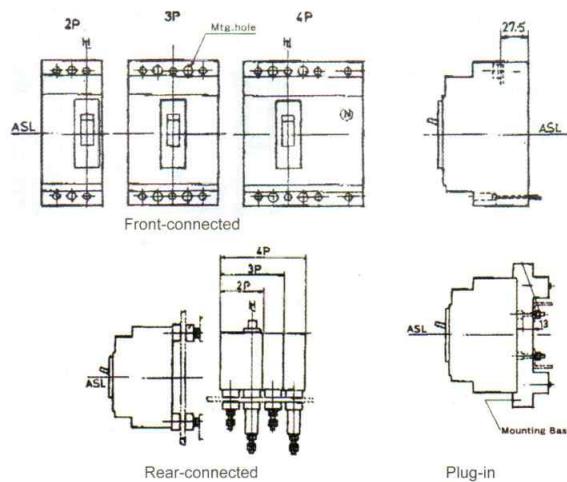
The breaker trips by means of energizing the voltage to the shunt coil.

If the shunt coil is fitted to the breaker, information about the voltage and frequency to the coil itself is needed:

AC or DC \_\_\_\_\_ V, \_\_\_\_\_ Hz.

### 5. Other accessories

Accessories other than those listed above in lines 1~4 are sometimes fitted to the breaker. In such cases information about the name and type/model no. of the accessories is required when ordering.



## How to order: 79 - 31 - 61

Circuit Breaker with the following information:

- 1) Type of model number ..... TO-100BA
- 2) No. of poles ..... 3 pole
- 3) Frame size ..... 100A
- 4) Rated current ..... 75A
- 5) Method of mounting ..... plug in type  
Please specify whether the mounting base is necessary, or not.
- 6) Accessories
  1. Auxiliary switch ..... one normal open
  2. Alarm switch ..... NIL
  3. Under voltage trip coil ..... necessary AC440V, 60Hz
  4. Shunt trip coil ..... NIL
  5. Other accessories ..... NIL

## Transformers

Transformadores 変圧器 变压器

### Two Way

Transformadores de dos vías 両用型变压器

双向变压器

A compact, high efficiency 2-way volt converter. Appropriate for use with electrical house appliances.



## How to order: CODE

Transformer, PRIMARY VOLTAGE and SECONDARY VOLTAGE, AMPERE

Unit Per Pcs.

| CODE     | Input-Output | Capacity | Ampere |      |
|----------|--------------|----------|--------|------|
|          |              |          | Up     | Down |
| 79 33 01 |              | 100VA    | 0.5    | 1    |
| 02       | 110V-220V    | 200VA    | 1.0    | 2    |
| 03       | or           | 300VA    | 1.5    | 3    |
| 04       | 220V-100V    | 500VA    | 2.5    | 5    |
| 05       |              | 1KVA     | 5.0    | 10   |

## Step Down for Travel use

Step Down para viajes

旅行用ステップダウントランسفォーマー

旅行用降压型

A voltage converter designed for use of 100 volt appliances in countries with 220-240 volt current. The converter has A type 2-flat pins for inlet plug and outlet receptacle. Please mention if other types of plug or receptacle are necessary depends on your plug type of the apparatus and your receptacle type where it is used.



| CODE     | Model  | Max. Output Wattage for Primary AC Voltage |           | Size mm W x H x D | Weight gm | Unit Per Pcs. |  |
|----------|--------|--|-----------|-------------------|-----------|---------------|--|
|          |        | 110V-130V                                  | 220V-240V |                   |           |               |  |
| 79 33 21 | WT-71M | 75W  | 30W       | 54 x 82 x 55      | 380       |               |  |
| 22       | WT-72M | 120W                                       | 75W       | 65 x 110 x 62     | 700       |               |  |
| 23       | WT-73M | 240W                                       | 100W      | 65 x 110 x 62     | 770       |               |  |
| 24       | WT-74M | 300W                                       | 200W      | 80 x 120 x 68     | 1,250     |               |  |
| 79 33 25 | WT-75M | 50W  | 35W       | 58 x 92 x 30      | 285       |               |  |
| 26       | WT-77M | 140W                                       | 110W      | 95 x 142 x 30     | 750       |               |  |

Name of Mfr.: Kashimura Co., Ltd.

### Step Up/Down Transformers for Home Appliances

Transformadores Evadore/Reductores para Electrodomésticos

家電用アップダウントランクスフォーマー

升圧 / 降圧変圧器 家用电器



A voltage converter designed for use of 100 volt appliances in countries with 220-240 volt current, or 220-240 volt appliances in countries with 100 volt. The converter has A type 2-flat pins single inlet plug and 2 pairs of multi type (for A type 2-flat pins and C type round pins) outlet receptacles. Please mention if other types of plug or receptacle are necessary depends on your plug type of the apparatus and your receptacle type where it is used.

Unit Per Pcs.

| CODE     | Model   | Max. Output Wattage for Primary AC Voltage |           | Size mm W x H x D | Weight kg | Unit Per Pcs. |  |
|----------|---------|--|-----------|-------------------|-----------|---------------|--|
|          |         | 110V                                       | 220V-240V |                   |           |               |  |
| 79 33 31 | WT-11EJ | 550W                                       | 550W      | 125 x 100 x 165   | 3.6       |               |  |
| 32       | WT-12EJ | 1,000W                                     | 1,000W    | 125 x 100 x 165   | 4.5       |               |  |
| 33       | WT-13EJ | 1,500W                                     | 1,500W    | 134 x 110 x 175   | 6.0       |               |  |
| 34       | WT-14EJ | 1,500W                                     | 2,000W    | 145 x 110 x 200   | 7.1       |               |  |
| 35       | WT-15EJ | 1,500W                                     | 3,000W    | 182 x 134 x 240   | 11.0      |               |  |

Name of Mfr.: Kashimura Co., Ltd.

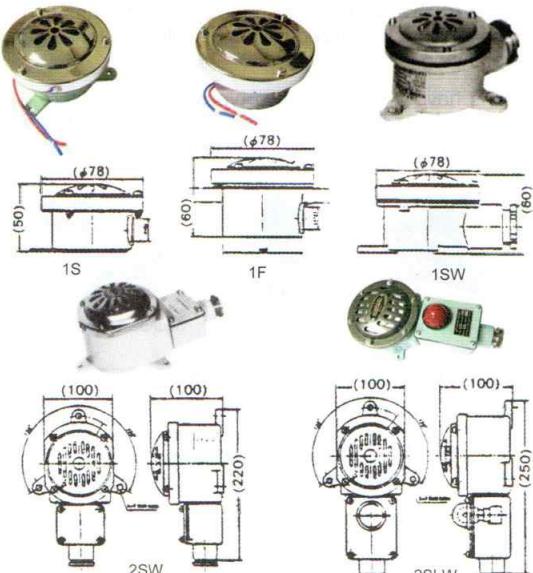
### 14. Buzzers & Bells

#### Marine Electric Alarm Buzzers

Sirenas Eléctrica Marina 船用ブザー 船用报警器

(Ref. JIS F 8502)

For emergency or engineer alarm signalling. Used where noise levels or acoustic properties can not be covered with ordinary signals. The mechanism is enclosed inside the housing. Available for DC or AC.



#### How to order: CODE

Alarm buzzer, CURRENT, TYPE, RATED VOLTAGE, REMARK

Unit Per Pcs.

| CODE           | Type | Rated Voltage | Sound level dB | Remark                               |
|----------------|------|---------------|----------------|--------------------------------------|
| For DC Current |      |               |                |                                      |
| 79 34 01       | 1S   |               | 80             | Surface Mounting                     |
| 79 34 02       | 1F   |               | 80             | Flush Mounting                       |
| 79 34 03       | 1SW  |               | 80             | Surface Mounting and Waterproof      |
| 79 34 04       | 2SW  |               | 90             | Surface Mounting and Waterproof      |
| 79 34 05       | 2SLW |               | 90             | Surface Mounting and with Pilot Lamp |

#### For AC Current

|          |      |     |  |                            |
|----------|------|-----|--|----------------------------|
| 79 34 11 | 1S   | 110 |  | Surface Mounting           |
| 79 34 12 |      | 220 |  |                            |
| 79 34 13 | 1F   | 110 |  | Flush Mounting             |
| 79 34 14 |      | 220 |  |                            |
| 79 34 15 | 1SW  | 110 |  | Surface Mounting           |
| 79 34 16 |      | 220 |  | Waterproof                 |
| 79 34 17 | 2SW  | 110 |  | Surface Mounting           |
| 79 34 18 |      | 220 |  | Waterproof                 |
| 79 34 19 | 2SLW | 110 |  | Surface Mounting           |
| 79 34 20 |      | 220 |  | Waterproof with Pilot Lamp |

Remark: 1. The type is classified in to 1 and 2 in accordance with sound level.

2. Type symbol S denotes surface mounting type, F, flush mounting type, L, buzzers with lamp, W, waterproof construction.

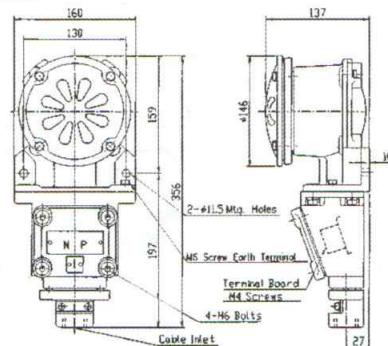
#### Alarm Buzzers

##### Explosion-proof Type

Sirenas/Tipo Antideflagrante

防爆型船用ブザー

警报蜂鸣器



Alarm buzzers suitable for use in hazardous areas, such as confined spaces and where explosive gas is a potential danger. Type of explosion-proof enclosure conforms to JIS C-0903 d2G4.

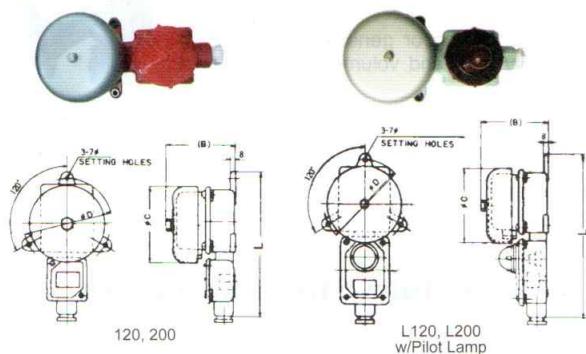
| CODE           | Model    | Voltage            | Capacity | Loudness | Weight  |
|----------------|----------|--------------------|----------|----------|---------|
| 79 34 27<br>28 | BXS-50-C | AC 100V<br>AC 200V | 50 VA    | 95 dB    | 11.5 kg |

#### Marine Electric Alarm Bells

Alarmas de Campana Eléctricas 船用ベル 船用防水警铃

(Ref. JIS F8501-1983)

Watertight type electric bells used for signalling and warning aboard ships.



**How to order: CODE**

Alarm bell, TYPE, RATED VOLTAGE, WITHOUT or WITH PILOT LAMP

| CODE                      | Type | Rated Voltage | Sound level dB | Unit Per Pcs. |           |
|---------------------------|------|---------------|----------------|---------------|-----------|
|                           |      |               |                | Bell Ø        | Overall L |
| <b>Without Pilot Lamp</b> |      |               |                |               |           |
| 79 34 31                  | 120  | DC-22         | 85             | 120           |           |
| 79 34 32                  | 200  |               | 95             | 200           |           |
| 79 34 33                  |      | AC-110        |                |               |           |
| 79 34 34                  | 120  | AC-220        | 85             | 120           | 230       |
| 79 34 35                  |      |               |                |               |           |
| 79 34 36                  | 200  | AC-110        | 95             | 200           |           |
|                           |      | AC-220        |                |               |           |
| <b>With Pilot Lamp</b>    |      |               |                |               |           |
| 79 34 41                  | L120 | DC-22         | 85             | 120           |           |
| 79 34 42                  | L200 |               | 95             | 200           |           |
| 79 34 43                  |      | AC-110        |                |               |           |
| 79 34 44                  | L120 | AC-220        | 85             | 120           | 265       |
| 79 34 45                  |      |               |                |               |           |
| 79 34 46                  | L200 | AC-110        | 95             | 200           |           |
|                           |      | AC-220        |                |               |           |

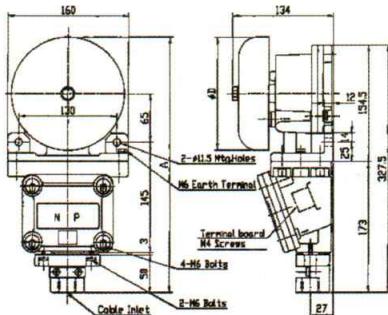
Remark: Type symbol L denotes with pilot lamp.

**Alarm Bells****Explosion-proof Type**

Alarma de Campana/Tipo Antideflagrante

防爆型ベル 警铃

Alarm bells suitable for use in hazardous areas, such as confined spaces and where explosive gas is a potential danger. Type of explosion-proof enclosure conforms to JIS C-0903 d2G4.



Unit Per Pcs.

| CODE           | Model  | Voltage            | Capacity      | Loudness | Weight |
|----------------|--------|--------------------|---------------|----------|--------|
| 79 34 51<br>52 | BX-10C | AC 100V<br>AC 200V | 22 VA<br>8 VA | 80 dB    | 5 kg   |
| 79 34 53       |        | DC 24V             |               |          |        |
| 79 34 54<br>55 | BX-15C | AC 100V<br>AC 200V | 22 VA<br>8 VA | 85 dB    | 5.5 kg |
| 79 34 56       |        | DC 24V             |               |          |        |
| 79 34 57<br>58 | BX-20C | AC 100V<br>AC 200V | 22 VA<br>8 VA | 87 dB    | 6 kg   |
| 79 34 59       |        | DC 24V             |               |          |        |

**Watertight Electric Horns**

Conectores para Cable de Saldadura

防水電動ホーン 焊接电缆接头

For fast coding or general alarms. High intensity tone and volume. Made of cast aluminium.



Unit Per Pcs.

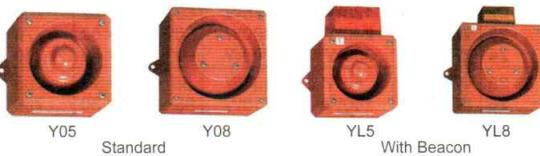
| CODE     | Voltage | Size mm   |           | Weight kg |
|----------|---------|-----------|-----------|-----------|
|          |         | Trumpet Ø | Overall L |           |
| 79 34 61 | DC- 22V |           |           |           |
| 62       | AC-110V | 100       | 420       | 1.6       |
| 63       | AC-220V |           |           |           |

**Marine Multi-Stage Sounders**

Sondas marinas multietapa

船用多段階サウンダー 船用多级测深仪

Industrial multi-stage alarms in several sound level, each stage is determined by a 5-way DIL switch. Signaling 32 selectable tones which is meeting international regulations. Made of flame-retardant ABS plastic enclosure. Can be used in conjunction with beacons to form a combination Sounder/Strobe. IP 65.

**How to order: CODE**

Multi-stage sounder, CURRENT, TYPE, RATED VOLTAGE, REMARK

| CODE                   | Type | Rated Voltage | Sound level dB | Remark |
|------------------------|------|---------------|----------------|--------|
| <b>32 Tone Sounder</b> |      |               |                |        |

|          |     |        |     |  |
|----------|-----|--------|-----|--|
| 79 34 64 |     | DC 24V |     |  |
| 79 34 65 | Y05 | AC115V | 110 |  |
| 79 34 66 |     | AC230V |     |  |
| 79 34 67 |     | DC 24V |     |  |
| 79 34 68 | Y08 | AC115V | 116 |  |
| 79 34 69 |     | AC230V |     |  |

**Beacon 6 32 Tone Sounder**

|          |     |        |     |  |
|----------|-----|--------|-----|--|
| 79 34 70 |     | DC 24V |     |  |
| 79 34 71 | YL5 | AC115V | 110 |  |
| 79 34 72 |     | AC230V |     |  |
| 79 34 73 |     | DC 24V |     |  |
| 79 34 74 | YL8 | AC115V | 116 |  |
| 79 34 75 |     | AC230V |     |  |

**Explosion Proof Sounders & Beacons**

Sirenas y balizas antideflagrantes

防爆型サウンダー&ビーコン

船用多级测深仪

Sounders and beacons for use in potentially explosive atmospheres and very harsh environmental conditions. Typical applications are Oil and Gas, On-shore and Offshore, Chemical, Petrochemical, Refineries & Marine locations etc. The unit incorporates a 3 or 4 stage alarm option with 60 tones to choose from which includes four tones that can be recorded or customized by the installer. All tones can be pre-set during installation.

Beacons have a choice of two types of light source: either Xenon (strobe) with multiple flash rate and power ratings or an LED array with three status type indication options and two power ratings.



Sounder      Beacon      Sounder & Beacon

**Specifications**

|                      |   |
|----------------------|---|
| Explosion Protection | ATEX: Ex d IIC T4-T6 Gb,<br>Ex tb IIIC T135°C-T85°C, Zone 1, 2, 21 & 22   |
| IECEx                | EN 60079-0:2012 (IEC 60079-0:2011),<br>EN-60079-1:2007 (IEC 60079-1:2007)<br>EN 60079-31:2009 (IEC 60079-31:2008) |
| Ambient Temperature  | -40°C up to +70°C   |
| Humidity             | ≤ 95% RH  |

| CODE                        | Type                    | Rated Voltage | Sound level dB | Remark                                | Unit Per Pcs. |
|-----------------------------|-------------------------|---------------|----------------|---------------------------------------|---------------|
| <b>Sounder</b>              |                         |               |                |                                       |               |
| 79 34 76                    | SD150                   | DC12-48V      | 115            | -                                     |               |
| 79 34 77                    |                         | AC100-120V    |                |                                       |               |
| <b>Beacon</b>               |                         |               |                |                                       |               |
| 79 34 78                    | BC150                   | DC12-48V      | -              | Available in amber, red, blue colours |               |
| 79 34 79                    |                         | AC100-240V    |                |                                       |               |
| 79 34 80                    | BC150 (with lens guard) | DC12-48V      | -              | Available in amber, red, blue colours |               |
| 79 34 81                    |                         | AC100-240V    |                |                                       |               |
| <b>Sounder &amp; Beacon</b> |                         |               |                |                                       |               |
| 79 34 82                    | SB150                   | DC12-48V      | 115            | -                                     |               |
| 79 34 83                    |                         | AC100-240V    |                |                                       |               |
| 79 34 84                    | BC150 (with lens guard) | DC12-48V      | -              | Available in amber, red, blue colours |               |
| 79 34 85                    |                         | AC100-240V    |                |                                       |               |

## 15. Lamp Holders

### Lamp Holders

Portalámparas JIS型ソケット 灯支架

(Ref. JIS F 8401)

Marine lamp holders of the rated voltage 250 V or less mainly used for light fittings on board.

#### Flanged Type



FE-12 (79 35 01)



FB-15 (79 35 02)



FE-14 (79 35 03)



FE-26 (79 35 04)



FB-22 (79 35 05)



FE-39 (79 35 06)

#### Tubular Type



TE-26 (79 35 07)



TB-22 (79 35 08)



TE-39 (79 35 09)

#### With Brim



GE-26 (79 35 10)

| CODE     | Type  | Shape     | Rating |                 | Main Body Material | Unit Per Pcs. |
|----------|-------|-----------|--------|-----------------|--------------------|---------------|
|          |       |           | Volt   | Amp.            |                    |               |
| 79 35 01 | FE-12 | Flanged   | 125    | 1               | Synthetic Resin    | 2             |
|          | FB-15 |           |        | 1               | Synthetic Resin    |               |
|          | FE-14 |           |        | 1               | Synthetic Resin    |               |
|          | FE-26 |           | 250    | 6               | Porcelain          |               |
|          | FB-22 |           |        | 3               | Porcelain          |               |
|          | FE-39 |           |        | 5               | Brass              |               |
| 79 35 07 | TE-26 | Tubular   | 6      | Porcelain       |                    |               |
| 08       | TB-22 |           | 3      | Porcelain       |                    |               |
| 09       | TE-39 |           | 15     | Porcelain       |                    |               |
| 79 35 10 | GE-26 | With Brim | 6      | Synthetic Resin |                    |               |

## European Type Lamp Holders

Portalámparas Tipo Europeo ヨーロッパ型ソケット 欧式灯座

Various types of brass made lamp holders such as with threaded bushing, back plate or mounting lug and they are all easily connected to the lighting fixture.

|                                    |        |                  |
|------------------------------------|--------|------------------|
| Lamp Base                          | BA-15D | B-22             |
| Thread                             | M10    | 3/8", 1/2", 5/8" |
| Bayonet Type with Threaded Bushing |        |                  |
|                                    |        |                  |

|                                  |      |      |
|----------------------------------|------|------|
| Lamp Base                        | E-27 | E-40 |
| Thread                           | M10  | 3/8" |
| Screw Type with Threaded Bushing |      |      |
|                                  |      |      |

|                              |        |      |
|------------------------------|--------|------|
| Lamp Base                    | BA-15D | B-22 |
| Bayonet Type with Back Plate |        |      |
| Bayonet Type with Back Plate |        |      |

|   |                          |            |
|---|--------------------------|------------|
| Lamp Base                               | BA-15D, B-22, E-14, E-27 | B-22, E-27 |
| Nos. of Lug                             | 2                        | 3          |
| Screw of Bayonet Type with Mounting Lug |                          |            |
|   |                          |            |

#### How to order: CODE

Lamp holder, European type, BASE TYPE, THREAD or LUG NUMBER

| CODE                                    | Base Type | Remark                             | Thread or Lug Number |
|---|-----------|------------------------------------|----------------------|
| 79 35 16                                | BA-15D    |                                    | M10                  |
| 79 35 17                                | B-22      | Bayonet Type with Threaded Bushing | 3/8                  |
| 79 35 18                                |           |                                    | 1/2                  |
| 79 35 19                                |           |                                    | 5/8                  |
| 79 35 20                                | E-27      | Screw Type with Threaded Bushing   | M10                  |
| 79 35 21                                | E-40      |                                    | 3/8                  |
| 79 35 22                                | BA-15D    | Bayonet Type with Back Plate       | -                    |
| 79 35 23                                | B-22      |                                    |                      |
| 79 35 24                                | BA-15D    |                                    |                      |
| 79 35 25                                | B-22      |                                    |                      |
| 79 35 26                                | E-14      |                                    |                      |
| 79 35 27                                | E-27      |                                    |                      |
| 79 35 28                                | B-22      |                                    |                      |
| 79 35 29                                | E-27      |                                    |                      |
| Screw or Bayonet Type with Mounting Lug |           |                                    | 2                    |
|   |           |                                    | 3                    |

## Lamp Holders

### for Cap Base Halogen Lamp R7S

Portalámparas para lámpara halógena R7S de la base de la tapa

ハロゲンランプ R7S 用ランプホルダー 卤素灯 R7S 用灯座



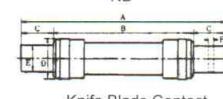
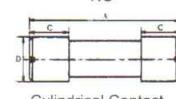
for Max. 500W

for Max. 1,000W

for Max. 2,000W

| CODE     | Descriptions   | Unit |
|----------|--|------|
| 79 35 30 | For max. 500W R7S halogen lamp   | Pc.  |
| 79 35 31 | For max. 1,000W R7S halogen lamp, with side connection with heat resistant cable | Pc.  |
| 79 35 32 | For max. 2,000W R7S halogen lamp, with back connection and heat resistant cable  | Pc.  |

Totally enclosed cartridge type fuse with a large breaking capacity. Excellent current limiting characteristics with no danger of explosion or flaming at breaking. Economical because the fusing element unit is replaceable. These types are approved by N.K., Lloyd, BV, ABS, and G. Lloyd.

Cylindrical Contact  
Knife Blade Contact

## Specifications

|                         |                                      |  |
|-------------------------|--------------------------------------|--|
| Feature                 | Totally enclosed Cartridge Type Fuse |  |
| Rated Capacity          | AC 500/DC 250V, 1A-200A              |  |
| Rated Breaking Capacity | 20,000A                              |  |
| Fusing Factor           | 135                                  |  |

## Dimensions mm

| Type | A   | B   | C    | D  | E  | Contact     |
|------|-----|-----|------|----|----|-------------|
| NC-1 | 50  |     | 13.2 | 15 |    | Cylindrical |
| NC-2 | 75  |     | 16.2 | 20 |    | Cylindrical |
| NB-3 | 150 | 100 |      | 29 | 20 | Knife Blade |
| NB-4 | 180 | 110 |      | 40 | 30 | Knife Blade |

## How to order: CODE

Cello-lite fuse, TYPE, AMPERE

## How to order: CODE

Fuse element for TYPE, AMPERE

| Unit Per Set            |      | Unit Per Pcs. |                    |              |
|-------------------------|------|---------------|--------------------|--------------|
| Case & Element Complete | Type | Ampere        | Rated Voltage      | Element Only |
| CODE                    |      |               |                    | CODE         |
| 79 36 61                | NC-1 | 1             | AC 500V<br>DC 250V | 79 36 91     |
| 62                      |      | 3             |                    | 92           |
| 63                      |      | 5             |                    | 93           |
| 64                      |      | 10            |                    | 94           |
| 65                      |      | 15            |                    | 95           |
| 66                      |      | 20            |                    | 96           |
| 67                      |      | 25            |                    | 97           |
| 68                      |      | 30            |                    | 98           |
| 79 36 71                | NC-2 | 40            | 79 37 01           | 79 37 01     |
| 72                      |      | 50            |                    | 02           |
| 73                      |      | 60            |                    | 03           |
| 79 36 76                | NB-3 | 75            | 79 37 06           | 79 37 06     |
| 77                      |      | 100           |                    | 07           |
| 79 36 81                | NB-4 | 125           | 79 37 11           | 79 37 11     |
| 82                      |      | 150           |                    | 12           |
| 83                      |      | 175           |                    | 13           |
| 84                      |      | 200           |                    | 14           |

## Fuse Wire

Alambre para Fusible 糸ヒューズ 保险丝



Unit Per Spool

| CODE     | Ampere | Weight Grm./Spool | CODE     | Ampere | Weight Grm./Spool |
|----------|--------|-------------------|----------|--------|-------------------|
| 79 37 21 | 1      | 225               | 79 37 26 | 20     | 450               |
| 22       | 3      | 225               | 27       | 30     | 450               |
| 23       | 5      | 450               | 28       | 40     | 450               |
| 24       | 10     | 450               | 29       | 50     | 450               |
| 25       | 15     | 450               | 30       | 60     | 450               |

## Cello-Lite Cartridge Fuses

Type NC &amp; Type NB

Fusibles de Cartucho Cello-Lite - Tipo NC y Tipo NB  
NC.NB型セロライトヒューズ 密闭型保险丝

## Fuse Pullers

Extractores para Fusible Tipos Tijera - Tipo Mariposa  
ピューズ抜き 保险丝钳

Eliminates the danger of shock when removing cartridge fuses by hand and the problem of bending fuse clips due to the wrong removal.

Unit Per Pr.

| CODE     | 79 37 36  | 79 37 37  |
|----------|---|---|
| Type     |  |  |
| Size mm  | W40 x L180  | W80 x L110  |
| Capacity | 30 - 60A  | 30 - 60A  |
| Material | Nylon Resin   | Phenol Resin  |

## Cello-Lite Cartridge Fuses

### Type UC & Type UB

Fusibles de Cartucho Cello-Lite - Tipo UC y Tipo UB

UC • UB 型セロライトヒューズ UC 及 UB 型匣式保险丝

Cartridge type non-renewable fuse with high breaking capacity and current-limiting.

Complies with the specification of JIS C 8314 for particular requirements for low-voltage cartridge fuses, and duly approved by Nippon Kaiji Kyokai (NK), The Lloyd's Register (LR), American Bureau of Shipping (ABS), and Bureau Veritas (BV). Due to totally enclosed non-renewable construction, it insures safe operation, not allowing any flame or gas to burst at the moment of interruption.

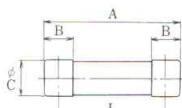


Diagram A

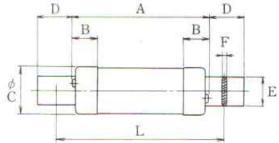


Diagram B

### Standard Rating

| Type | Rated Voltage | Rated Current amp.          | Fusing Factor | Rated Breaking Capacity kA |
|------|---------------|-----------------------------|---------------|----------------------------|
| UC-1 |               | 1, 3, 5, 10, 15, 20, 25, 30 |               | AC 50 (ACL 50)             |
| UC-2 | AC 500        | 40, 50, 60                  | 1.35          |                            |
| UB-3 | DC 250        | 75, 100                     |               | DC 20 (DCL 20)             |
| UB-4 |               | 125, 150, 175, 200          |               |                            |

### Dimensions

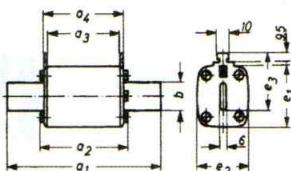
| Type Number | Rated Current Amp          | Dimensions mm |      |    |    |    |     |     | Diagram | Weight |
|-------------|----------------------------|---------------|------|----|----|----|-----|-----|---------|--------|
|             |                            | A             | B    | C  | D  | E  | F   | L   |         |        |
| UC-1        | 1.3, 5, 10, 15, 20, 25, 30 | 50            | 13.0 | 15 | -  | -  | -   | 38  | A       | 20     |
| UC-2        | 40, 50, 60                 | 75            | 16.0 | 20 | -  | -  | -   | 60  | A       | 51     |
| UB-3        | 75, 100                    | 95            | 17.5 | 30 | 25 | 20 | 3.2 | 120 | B       | 160    |
| UB-4        | 125, 150, 175, 200         | 110           | 20.5 | 42 | 35 | 30 | 4.5 | 145 | B       | 395    |

|          |      | Unit Per Pcs. |          |      |        |
|----------|------|---------------|----------|------|--------|
| CODE     | Type | Ampere        | CODE     | Type | Ampere |
| 79 37 41 | UC-1 | 1             | 79 37 52 | UB-3 | 75     |
| 42       |      | 3             | 53       |      | 100    |
| 43       |      | 5             | 79 37 54 | UB-4 | 125    |
| 44       |      | 10            | 55       |      | 150    |
| 45       |      | 15            | 56       |      | 175    |
| 46       |      | 20            | 57       |      | 200    |
| 47       |      | 25            |          |      |        |
| 48       |      | 30            |          |      |        |
| 79 37 49 | UC-2 | 40            |          |      |        |
| 50       |      | 50            |          |      |        |
| 51       |      | 60            |          |      |        |

## NH (HRC) Cartridge Fuses

Fusibles de Cuchilla HRC カートリッジヒューズ HRC 匣式保险丝

Low voltage high breaking capacity fuses. LV, HRC fuse links 500V AC for line protection, low-loss. Size 00 - 3 in accordance with DIN 57636 Part 2/VDE 0636 Part 2, class of operation gl IEC 269-2, class of operation gl. Knife contacts, ceramic insulating body, and indicator on the front plate.



General Size Table

| Type | Rating Amp. | Size mm        |                |                |                |    |                |                |
|------|-------------|----------------|----------------|----------------|----------------|----|----------------|----------------|
|      |             | a <sub>1</sub> | a <sub>2</sub> | a <sub>3</sub> | a <sub>4</sub> | b  | e <sub>1</sub> | e <sub>2</sub> |
| 00   | 6-100       | 79             | 54             | 46             | 49             | 15 | 35             | 20.5           |
|      | 125-160     | 79             | 54             | 46             | 49             | 15 | 44             | 30             |
| 0    | 6-160       | 125            | 68             | 63             | 66             | 15 | 44             | 30             |
| 1    | 35-160      | 135            | 70             | 63             | 67             | 20 | 44             | 30             |
|      | 200-250     | 135            | 70             | 63             | 67             | 20 | 47             | 50             |
| 2    | 35-160      | 150            | 72             | 63             | 67             | 26 | 44             | 30             |
|      | 200-250     | 150            | 72             | 63             | 67             | 26 | 47             | 57.5           |
|      | 315-400     | 150            | 72             | 63             | 67             | 26 | 52             | 44             |
| 3    | 315-400     | 150            | 72             | 63             | 67             | 33 | 58             | 52             |
|      | 500-630     | 150            | 72             | 63             | 67             | 33 | 70             | 64             |

## NH (HRC) Cartridge Fuse Links

### 500V AC/6 - 160A Size "00"



Unit Per Pcs.

| CODE     | Rating Amp. | CODE     | Rating Amp. | CODE     | Rating Amp. |
|----------|-------------|----------|-------------|----------|-------------|
| 79 38 01 | 6A          | 79 38 05 | 25A         | 79 38 09 | 80A         |
| 02       | 10A         | 06       | 35A         | 10       | 100A        |
| 03       | 16A         | 07       | 50A         | 11       | 125A        |
| 04       | 20A         | 08       | 63A         | 12       | 160A        |

### 500V AC/6 - 160A Size "0"



Unit Per Pcs.

| CODE     | Rating Amp. | CODE     | Rating Amp. | CODE     | Rating Amp. |
|----------|-------------|----------|-------------|----------|-------------|
| 79 38 16 | 6A          | 79 38 20 | 25A         | 79 38 24 | 80A         |
| 17       | 10A         | 21       | 35A         | 25       | 100A        |
| 18       | 16A         | 22       | 50A         | 26       | 125A        |
| 19       | 20A         | 23       | 63A         | 27       | 160A        |

## 500V AC/35 – 250A Size "1"



Unit Per Pcs.

| CODE     | Rating Amp. | CODE     | Rating Amp. | CODE     | Rating Amp. |
|----------|-------------|----------|-------------|----------|-------------|
| 79 38 31 | 35A         | 79 38 34 | 80A         | 79 38 37 | 160A        |
| 32       | 50A         | 35       | 100A        | 38       | 200A        |
| 33       | 63A         | 36       | 125A        | 39       | 250A        |

## 500V AC/35 – 400A Size "2"



Unit Per Pcs.

| CODE     | Rating Amp. | CODE     | Rating Amp. | CODE     | Rating Amp. |
|----------|-------------|----------|-------------|----------|-------------|
| 79 38 41 | 35A         | 79 38 45 | 100A        | 79 38 49 | 250A        |
| 42       | 50A         | 46       | 125A        | 50       | 315A        |
| 43       | 63A         | 47       | 160A        | 51       | 400A        |
| 44       | 80A         | 48       | 200A        |          |             |

## 500V AC/315-630A Size "3"



Unit Per Pcs.

| CODE     | Rating Amp. | CODE     | Rating Amp. |
|----------|-------------|----------|-------------|
| 79 38 55 | 315A        | 79 38 57 | 500A        |
| 56       | 400A        | 58       | 630A        |

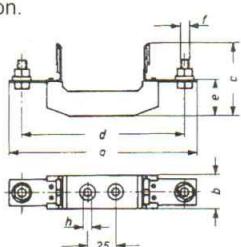
**NH (HRC) Single Pole Fuse Bases**

500/660V AC Size – "00" – "3"

Bases portafusibles unipolares NH (HRC)

NH (HRC) 单极ヒューズベース NH (HRC) 单极保险丝底座

All ceramic base plate with surface contact formed from one piece, galvanic surface protection.



| Type | Rating Amp. | Size mm |    |    |     |    |     |    |      |
|------|-------------|---------|----|----|-----|----|-----|----|------|
|      |             | a       | b  | c  | d   | e  | f   | g  | h    |
| 00   | 100A        | 120     | 33 | 58 | 100 | 24 | M 6 | -  | 7.5  |
|      | 160A        | 120     | 33 | 58 | 100 | 24 | M 8 | -  | 7.5  |
| 0    | 160A        | 170     | 30 | 65 | 148 | 31 | M 8 | -  | 7.5  |
| 1    | 250A        | 196     | 45 | 79 | 173 | 35 | M10 | 30 | 10.5 |
| 2    | 400A        | 225     | 52 | 88 | 200 | 35 | M10 | 30 | 10.5 |
| 3    | 630A        | 250     | 52 | 90 | 210 | 38 | M12 | 30 | 10.5 |

| CODE     | Type | Amp. | CODE     | Type | Amp. |
|----------|------|------|----------|------|------|
| 79 38 61 | 00   | 100A | 79 38 64 | 1    | 250A |
| 62       | 00   | 160A | 65       | 2    | 400A |
| 63       | 0    | 160A | 66       | 3    | 630A |

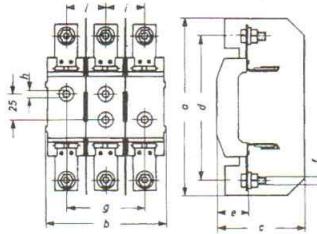
**NH (HRC) Triple Pole Fuse Bases**

500/660V AC Size – "00" – "2"

Bases portafusibles tripolares NH (HRC)

NH (HRC) 三極ヒューズベース NH (HRC) 三极保险丝底座

Sheet steel base plate steatite insulators with surface contact formed from one piece, galvanic surface protection.



| Type | Rating Amp. | Size mm |     |     |     |    |     |     |      |    |
|------|-------------|---------|-----|-----|-----|----|-----|-----|------|----|
|      |             | a       | b   | c   | d   | e  | f   | g   | h    | i  |
| 00   | 100A        | 138     | 96  | 85  | 100 | 24 | M 6 | 66  | 7.5  | 33 |
|      | 160A        | 138     | 96  | 85  | 100 | 24 | M 8 | 66  | 7.5  | 33 |
| 0    | 160A        | 180     | 131 | 88  | 148 | 31 | M 8 | 87  | 7.5  | 44 |
| 1    | 250A        | 214     | 168 | 108 | 173 | 35 | M10 | 108 | 10.5 | 54 |
| 2    | 400A        | 260     | 188 | 115 | 200 | 35 | M10 | 125 | 10.5 | 62 |

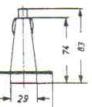
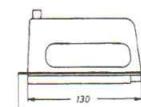
| Unit Per Pcs. |      |      |          |      |      |
|---------------|------|------|----------|------|------|
| CODE          | Type | Amp. | CODE     | Type | Amp. |
| 79 38 71      | 00   | 100A | 79 38 74 | 1    | 250A |
| 72            | 00   | 160A | 75       | 2    | 400A |
| 73            | 0    | 160A |          |      |      |

**NH (HRC) Fuse Link Universal Handles**

Maneta Extracción Fusibles de Cuchilla

HRC ナイフヒューズハンドル HRC 刀式保险丝万能手把

For H.R.C. or European standard fuse links. Made from bakelite with solid metal parts, zinc plated for all size knife fuses "00" to "4".



79 38 80 Handle, universal for NH (HRC) fuse link Pcs.

**DIN Style Diazed Fuses**

Fusibles de Botella D D カートリッジヒューズ D 型保险丝

Fuse links are made from ceramic material of high compression strength to withstand high mechanical and thermal stresses. Copper alloy made top and bottom contact discs. A coloured indicator disc is fixed to the front contact plate, giving a clear indication of the state of the fuses in use. Please specify the required type of action "Time Lag" (Delayed action) or "Quick Acting" (Quick response) when ordering.



"D" Screw Cap



"D" Cartridge Fuse



"D" Gauge Piece



Contact Protecting Cover

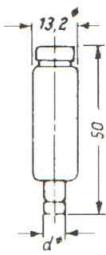


"D" Fuse Base

**Diazed Fuses****500V/2 – 25A Type E-16**

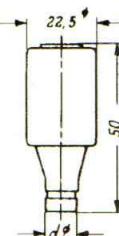
Unit Per Pcs.

| Time Lag<br>(Delayed Action) |                |                 | Quick Acting<br>(Quick Response) |                |                 |
|------------------------------|----------------|-----------------|----------------------------------|----------------|-----------------|
| CODE                         | Rating<br>Amp. | Diam.<br>"d" mm | CODE                             | Rating<br>Amp. | Diam.<br>"d" mm |
| 79 39 01                     | 2A             | 6               | 79 39 51                         | 2A             | 6               |
| 02                           | 4A             | 6               |                                  | 52             | 4A              |
| 03                           | 6A             | 6               |                                  | 53             | 6A              |
| 04                           | 10A            | 8               |                                  | 54             | 10A             |
| 05                           | 16A            | 10              |                                  | 55             | 16A             |
| 79 39 06                     | 20A            | 12              | 79 39 56                         | 20A            | 12              |
| 07                           | 25A            | 14              |                                  | 57             | 25A             |

**500V/2 – 25A Type E-27**

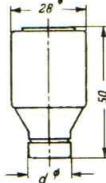
Unit Per Pcs.

| Time Lag<br>(Delayed Action) |                |                 | Quick Acting<br>(Quick Response) |                |                 |
|------------------------------|----------------|-----------------|----------------------------------|----------------|-----------------|
| CODE                         | Rating<br>Amp. | Diam.<br>"d" mm | CODE                             | Rating<br>Amp. | Diam.<br>"d" mm |
| 79 39 11                     | 2A             | 6               | 79 39 61                         | 2A             | 6               |
| 12                           | 4A             | 6               |                                  | 62             | 4A              |
| 13                           | 6A             | 6               |                                  | 63             | 6A              |
| 14                           | 10A            | 8               |                                  | 64             | 10A             |
| 15                           | 16A            | 10              |                                  | 65             | 16A             |
| 79 39 16                     | 20A            | 12              | 79 39 66                         | 20A            | 12              |
| 17                           | 25A            | 14              |                                  | 67             | 25A             |

**500V/35 – 63A Type E-33**

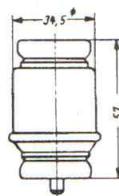
Unit Per Pcs.

| Time Lag<br>(Delayed Action) |                |                 | Quick Acting<br>(Quick Response) |                |                 |
|------------------------------|----------------|-----------------|----------------------------------|----------------|-----------------|
| CODE                         | Rating<br>Amp. | Diam.<br>"d" mm | CODE                             | Rating<br>Amp. | Diam.<br>"d" mm |
| 79 39 21                     | 35A            | 16              | 79 39 71                         | 35A            | 16              |
| 22                           | 50A            | 18              |                                  | 72             | 50A             |
| 23                           | 63A            | 20              |                                  | 73             | 63A             |

**500V/80 – 100A Type R-1-1/4"**

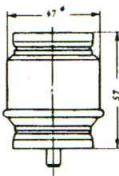
Unit Per Pcs.

| Time Lag<br>(Delayed Action) |                |               | Quick Acting<br>(Quick Response) |                |               |
|------------------------------|----------------|---------------|----------------------------------|----------------|---------------|
| CODE                         | Rating<br>Amp. | kg<br>per pc. | CODE                             | Rating<br>Amp. | kg<br>per pc. |
| 79 39 26                     | 80A            | 0.107         | 79 39 76                         | 80A            | 0.107         |
| 27                           | 100A           | 0.11          |                                  | 77             | 100A          |

**500V/125 – 200A Type R-2"**

Unit Per Pcs.

| Time Lag<br>(Delayed Action) |                |               | Quick Acting<br>(Quick Response) |                |               |
|------------------------------|----------------|---------------|----------------------------------|----------------|---------------|
| CODE                         | Rating<br>Amp. | kg<br>per pc. | CODE                             | Rating<br>Amp. | kg<br>per pc. |
| 79 39 31                     | 125A           | 0.207         | 79 39 81                         | 125A           | 0.207         |
| 32                           | 160A           | 0.21          |                                  | 82             | 160A          |
| 33                           | 200A           | 0.22          |                                  | 83             | 200A          |

**"D" Fuse Caps**

Tapones para Fusible "D"

ヨーロッパ形ヒューズキャップ D 保险丝盖

For D-type cartridge fuses up to 200 amperes and 500 volts. Porcelain made body with a nickel-plated brass screw.



| CODE     | Type | Amp<br>up<br>to | Size<br>mm |    | CODE     | Type     | Amp<br>up<br>to | Size<br>mm |
|----------|------|-----------------|------------|----|----------|----------|-----------------|------------|
|          |      |                 | a          | b  |          |          |                 |            |
| 79 39 41 | E-16 | 25              | 34         | 27 | 79 39 44 | R-1-1/4" | 100             | 52         |
| 42       | E-27 | 25              | 42         | 38 | 45       | R-2"     | 200             | 52         |
| 43       | E-33 | 63              | 43         | 48 |          |          |                 | 80         |

**DIN Style D0 (Neozed) Fuses**

Fusible de Tipo D0 (Neozed) DIN

ネオゼットヒューズ DIN型 D0 (Neozed) 保険絲

Do fuse links are manufactured in three sizes in rating from 2 to 100 amps. Please specify the required type of action "Time Lag" (Delayed action) or "Quick Acting" (Quick response) when ordering.

**500V/2-16A Type E-14**

Unit Per Pcs.

| Time Lag<br>(Delayed Action) |                |                | Quick Acting<br>(Quick Response) |                |                |
|------------------------------|----------------|----------------|----------------------------------|----------------|----------------|
| CODE                         | Rating<br>Amp. | Diam x L<br>mm | CODE                             | Rating<br>Amp. | Diam x L<br>mm |
| 79 40 01                     | 2A             |                | 79 40 06                         | 2A             |                |
| 02                           | 4A             |                | 07                               | 4A             |                |
| 03                           | 6A             | 11 x 36        | 08                               | 6A             | 11 x 36        |
| 04                           | 10A            |                | 09                               | 10A            |                |
| 05                           | 16A            |                | 10                               | 16A            |                |

**500V/20-63A Type E-18**

Unit Per Pcs.

| Time Lag<br>(Delayed Action) |                |                | Quick Acting<br>(Quick Response) |                |                |
|------------------------------|----------------|----------------|----------------------------------|----------------|----------------|
| CODE                         | Rating<br>Amp. | Diam x L<br>mm | CODE                             | Rating<br>Amp. | Diam x L<br>mm |
| 79 40 11                     | 20A            |                | 79 40 16                         | 20A            |                |
| 12                           | 25A            |                | 17                               | 25A            |                |
| 13                           | 35A            | 15 x 36        | 18                               | 35A            | 15 x 36        |
| 14                           | 50A            |                | 19                               | 50A            |                |
| 15                           | 63A            |                | 20                               | 63A            |                |

**500V/80-100A Type M30X2**

Unit Per Pcs.

| Time Lag (Delayed Action) |                |                |
|---------------------------|----------------|----------------|
| CODE                      | Rating<br>Amp. | Diam x L<br>mm |
| 79 40 21                  | 80A            | 22.5 x 43      |
| 79 40 22                  | 100A           | 22.5 x 43      |

**IEC Industrial Cylindrical Fuses**

Fusible Cilindrico Industrial IEC

IEC 型セラミックヒューズ IEC 工業用圓筒保険絲

Made from Ceramic bodies and silver plated copper end caps. gG/gL indicates Full range breaking capacity for General Industrial applications, and aM indicates Partial range breaking capability for Motor protection.



**Class gG/gL (Quick Acting)**

8 × 32mm

Unit Per Pc.

| CODE     | Rated Current | Voltage AC | Breaking Capacity |
|----------|---------------|------------|-------------------|
| 79 40 31 | 0.5A          | 400V       | 20kA              |
| 32       | 1A            |            |                   |
| 33       | 2A            |            |                   |
| 34       | 4A            |            |                   |
| 35       | 6A            |            |                   |
| 79 40 36 | 8A            |            |                   |
| 37       | 10A           |            |                   |
| 38       | 12A           |            |                   |
| 39       | 16A           |            |                   |
| 40       | 20A           |            |                   |
| 79 40 41 | 25A           |            |                   |

10 × 38mm

Unit Per Pc.

| CODE     | Rated Current | Voltage AC | Breaking Capacity |
|----------|---------------|------------|-------------------|
| 79 40 46 | 0.5A          | 500V       | 120kA             |
| 47       | 1A            |            |                   |
| 48       | 2A            |            |                   |
| 49       | 4A            |            |                   |
| 50       | 6A            |            |                   |
| 79 40 51 | 8A            |            |                   |
| 52       | 10A           |            |                   |
| 53       | 12A           |            |                   |
| 54       | 16A           |            |                   |
| 55       | 20A           |            |                   |
| 79 40 56 | 25A           |            |                   |
| 79 40 57 | 32A           | 400V       |                   |

14 × 51mm

Unit Per Pc.

| CODE     | Rated Current | Voltage AC | Breaking Capacity |
|----------|---------------|------------|-------------------|
| 79 40 61 | 1A            | 690V       | 80kA              |
| 62       | 2A            |            |                   |
| 63       | 4A            |            |                   |
| 64       | 6A            |            |                   |
| 65       | 8A            |            |                   |
| 79 40 66 | 10A           |            |                   |
| 67       | 12A           |            |                   |
| 68       | 16A           |            |                   |
| 69       | 20A           |            |                   |
| 70       | 25A           |            |                   |
| 79 40 71 | 32A           | 500V       | 120kA             |
| 79 40 72 | 40A           |            |                   |
| 79 40 73 | 50A           | 400V       |                   |

22 × 58mm

Unit Per Pc.

| CODE     | Rated Current | Voltage AC | Breaking Capacity |
|----------|---------------|------------|-------------------|
| 79 40 76 | 2A            | 690V       | 80kA              |
| 77       | 4A            |            |                   |
| 78       | 6A            |            |                   |
| 79       | 8A            |            |                   |
| 80       | 10A           |            |                   |
| 79 40 81 | 12A           |            |                   |
| 82       | 16A           |            |                   |
| 83       | 20A           |            |                   |
| 84       | 25A           |            |                   |
| 85       | 32A           |            |                   |
| 79 40 86 | 40A           | 500V       | 120kA             |
| 87       | 50A           |            |                   |
| 88       | 63A           |            |                   |
| 89       | 80A           |            |                   |
| 79 40 90 | 100A          |            |                   |
| 79 40 91 | 125A          | 400V       |                   |

**Class aM (Slow Acting)**

8 × 32mm

Unit Per Pc.

| CODE     | Rated Current | Voltage AC | Breaking Capacity |
|----------|---------------|------------|-------------------|
| 79 61 01 | 1A            | 400V       | 20kA              |
| 02       | 2A            |            |                   |
| 03       | 4A            |            |                   |
| 04       | 6A            |            |                   |
| 05       | 8A            |            |                   |
| 79 61 06 | 10A           |            |                   |
| 07       | 12A           |            |                   |
| 08       | 16A           |            |                   |
| 09       | 20A           |            |                   |
| 10       | 25A           |            |                   |

10 × 38mm

Unit Per Pc.

| CODE     | Rated Current | Voltage AC | Breaking Capacity |
|----------|---------------|------------|-------------------|
| 79 61 11 | 0.16A         | 500V       | 120kA             |
| 12       | 0.25A         |            |                   |
| 13       | 0.5A          |            |                   |
| 14       | 1A            |            |                   |
| 15       | 2A            |            |                   |
| 79 61 16 | 4A            |            |                   |
| 17       | 6A            |            |                   |
| 18       | 8A            |            |                   |
| 19       | 10A           |            |                   |
| 20       | 12A           |            |                   |
| 79 61 21 | 16A           |            |                   |
| 22       | 20A           |            |                   |
| 79 61 23 | 25A           | 400V       |                   |
| 24       | 32A           |            |                   |

14 × 51mm

Unit Per Pc.

| CODE     | Rated Current | Voltage AC | Breaking Capacity |
|----------|---------------|------------|-------------------|
| 79 61 26 | 0.25A         | 690V       | 80kA              |
| 27       | 0.5A          |            |                   |
| 28       | 1A            |            |                   |
| 29       | 2A            |            |                   |
| 30       | 4A            |            |                   |
| 79 61 31 | 6A            |            |                   |
| 32       | 8A            |            |                   |
| 33       | 10A           |            |                   |
| 34       | 12A           |            |                   |
| 35       | 16A           |            |                   |
| 79 61 36 | 20A           |            |                   |
| 37       | 25A           |            |                   |
| 79 61 38 | 32A           | 500V       | 120kA             |
| 39       | 40A           |            |                   |
| 79 61 40 | 50A           | 400V       |                   |

22 × 58mm

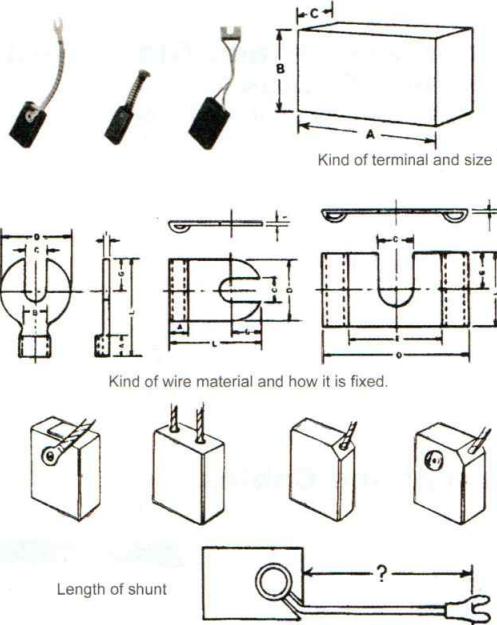
Unit Per Pc.

| CODE     | Rated Current | Voltage AC | Breaking Capacity |
|----------|---------------|------------|-------------------|
| 79 61 41 | 2A            | 690V       | 80kA              |
| 42       | 4A            |            |                   |
| 43       | 6A            |            |                   |
| 44       | 8A            |            |                   |
| 45       | 10A           |            |                   |
| 79 61 46 | 12A           |            |                   |
| 47       | 16A           |            |                   |
| 48       | 20A           |            |                   |
| 49       | 25A           |            |                   |
| 50       | 32A           |            |                   |
| 79 61 51 | 40A           |            |                   |
| 52       | 50A           |            |                   |
| 53       | 63A           |            |                   |
| 54       | 80A           |            |                   |
| 79 61 55 | 100A          | 500V       | 120kA             |
| 79 61 56 | 125A          | 400V       |                   |

## Carbon Brushes

Escobillas de Carbón カーボンブラシ 碳刷

When ordering, Carbon Brushes be sure to give the style as shown with the following information. Length, width, and thickness are shown as A, B, C in the illustration.



### How to order: 79 - 40 - 96

Carbon brush, size, kind of terminal, wire material, how it is fixed, shunt length (pc.)

## 17. Cables

### Welding Cables

Butyle Rubber Sheathed

1,000V or less – single conductor

Cables para Soldadura 溶接用電線 电焊电缆



Welding cable for general use. Cloth or paper wrapped wire sealed in rubber sheath.

| Unit Per Mtr. |                 |                |               |                       |            |
|---------------|-----------------|----------------|---------------|-----------------------|------------|
| CODE          | mm <sup>2</sup> | Strand O.D. mm | Cable O.D. mm | Cable Construction mm | Kg Per mtr |
| 79 41 01      | 22              | 7.0            | 11.8          | 0.45 x 20 x 7         | 0.31       |
| 02            | 38              | 9.1            | 14.5          | 0.45 x 34 x 7         | 0.50       |
| 03            | 60              | 11.7           | 17.5          | 0.45 x 20 x 19        | 0.75       |
| 04            | 100             | 15.2           | 21.8          | 0.45 x 34 x 19        | 1.23       |
| 05            | 150             | 18.7           | 25.9          | 0.45 x 34 x 27        | 1.71       |
| 79 41 06      | 200             | 21.2           | 29.0          | 0.45 x 34 x 37        | 2.30       |

### Rubber Cabtyre Cables

Natural Rubber Sheathed

600V or less – 1 to 4 conductors

Cables Eléctrico Bupreno ゴムキャブタイヤケーブル 橡胶电缆

Designed for electric tools and lighting fixtures. Natural rubber sheath encloses each conductor. Conductors completed with natural rubber sheath as a final seal. Fixed length is 200 mtrs/coil.



### How to order: CODE

Cable, rubber cabtyre, rubber sheathed, NUMBER of CONDUCTORS, NOMINAL mm<sup>2</sup>

| CODE               | Nominal mm <sup>2</sup> | Conductor       |         | Cable Out Diam. mm | Kg Per Mtr |
|--------------------|-------------------------|-----------------|---------|--------------------|------------|
|                    |                         | Construction mm | O.D. mm |                    |            |
| <b>1-Conductor</b> |                         |                 |         |                    |            |
| 79 41 11           | 0.75                    | 0.18 x 30       | 1.1     | 6.4                | 0.06       |
| 12                 | 1.25                    | 0.18 x 50       | 1.5     | 7.0                | 0.08       |
| 13                 | 2.0                     | 0.26 x 37       | 1.8     | 7.3                | 0.09       |
| 14                 | 3.5                     | 0.32 x 45       | 2.5     | 8.0                | 0.11       |
| 15                 | 5.5                     | 0.32 x 70       | 3.1     | 8.8                | 0.15       |
| 16                 | 8.0                     | 0.45 x 50       | 3.7     | 9.4                | 0.18       |
| 17                 | 14.0                    | 0.45 x 88       | 4.9     | 11.5               | 0.27       |
| <b>2-Conductor</b> |                         |                 |         |                    |            |
| 79 41 21           | 0.75                    | 0.18 x 30       | 1.1     | 10.5               | 0.16       |
| 22                 | 1.25                    | 0.18 x 50       | 1.5     | 11.5               | 0.19       |
| 23                 | 2.0                     | 0.26 x 37       | 1.8     | 12.0               | 0.22       |
| 24                 | 3.5                     | 0.32 x 45       | 2.5     | 13.5               | 0.30       |
| 25                 | 5.5                     | 0.32 x 70       | 3.1     | 15.0               | 0.38       |
| 26                 | 8.0                     | 0.45 x 50       | 3.7     | 16.5               | 0.47       |
| 27                 | 14.0                    | 0.45 x 88       | 4.9     | 21.0               | 0.73       |
| <b>3-Conductor</b> |                         |                 |         |                    |            |
| 79 41 31           | 0.75                    | 0.18 x 30       | 1.1     | 11.0               | 0.18       |
| 32                 | 1.25                    | 0.18 x 50       | 1.5     | 12.0               | 0.23       |
| 33                 | 2.0                     | 0.26 x 37       | 1.8     | 13.0               | 0.27       |
| 34                 | 3.5                     | 0.32 x 45       | 2.5     | 14.5               | 0.35       |
| 35                 | 5.5                     | 0.32 x 70       | 3.1     | 16.0               | 0.46       |
| 36                 | 8.0                     | 0.45 x 50       | 3.7     | 17.5               | 0.57       |
| 37                 | 14.0                    | 0.45 x 88       | 4.9     | 22.0               | 0.91       |
| <b>4-Conductor</b> |                         |                 |         |                    |            |
| 79 41 41           | 0.75                    | 0.18 x 30       | 1.1     | 12.0               | 0.21       |
| 42                 | 1.25                    | 0.18 x 50       | 1.5     | 13.0               | 0.27       |
| 43                 | 2.0                     | 0.26 x 37       | 1.8     | 14.0               | 0.32       |
| 44                 | 3.5                     | 0.32 x 45       | 2.5     | 16.0               | 0.44       |
| 45                 | 5.5                     | 0.32 x 70       | 3.1     | 17.5               | 0.57       |
| 46                 | 8.0                     | 0.45 x 50       | 3.7     | 19.5               | 0.72       |
| 47                 | 14.0                    | 0.45 x 88       | 4.9     | 24.0               | 1.16       |

### P.V.C. Cabtyre Cables

Portable Power Polyvinylchloride Sheathed

600V or less – 1 to 4 conductors

Cables Eléctrico P.V.C. ピニールキャブタイヤケーブル PVC 电线



For portable electric tools or wiring work. Each wire is covered with vinyl and an exterior vinyl sheath. Fixed length is 200 mtr/coil.

### How to order: CODE

Cable, P.V.C. cabtyre, NUMBER of CONDUCTORS, NOMINAL mm<sup>2</sup>

| CODE               | Nominal mm <sup>2</sup> | Conductor       |         | Cable Out Diam. mm | Kg Per Mtr |
|--------------------|-------------------------|-----------------|---------|--------------------|------------|
|                    |                         | Construction mm | O.D. mm |                    |            |
| <b>1-Conductor</b> |                         |                 |         |                    |            |
| 79 41 51           | 0.75                    | 0.18 x 30       | 1.1     | 5.7                | 0.04       |
| 52                 | 1.25                    | 0.18 x 50       | 1.5     | 6.1                | 0.05       |
| 53                 | 2.0                     | 0.26 x 37       | 1.8     | 6.4                | 0.06       |
| 54                 | 3.5                     | 0.32 x 45       | 2.5     | 7.3                | 0.09       |
| 55                 | 5.5                     | 0.32 x 70       | 3.1     | 8.3                | 0.12       |
| 56                 | 8.0                     | 0.45 x 50       | 3.7     | 9.5                | 0.16       |
| 57                 | 14.0                    | 0.45 x 88       | 4.9     | 11.5               | 0.24       |
| 58                 | 22.0                    | 0.45x20 x 7     | 7.0     | 14.5               | 0.38       |
| 59                 | 38.0                    | 0.45x34x7       | 9.1     | 17.0               | 0.58       |
| 60                 | 60.0                    | 0.45x20x19      | 11.6    | 20.0               | 0.85       |
| 61                 | 100.0                   | 0.45x34x19      | 15.2    | 25.0               | 1.37       |

| CODE               | Nominal mm <sup>2</sup> | Conductor       |         | Cable Out Diam. mm | Kg Per Mtr. | Unit Per Mtr. |                 |                       |
|--------------------|-------------------------|-----------------|---------|--------------------|-------------|---------------|-----------------|-----------------------|
|                    |                         | Construction mm | O.D. mm |                    |             | CODE          | mm <sup>2</sup> | Cable Construction mm |
| <b>2-Conductor</b> |                         |                 |         |                    |             |               |                 |                       |
| 79 41 66           | 0.75                    | 0.18 x 30       | 1.1     | 8.8                | 0.1         |               |                 |                       |
| 67                 | 1.25                    | 0.18 x 50       | 1.5     | 9.6                | 0.12        |               |                 |                       |
| 68                 | 2.0                     | 0.26 x 37       | 1.8     | 10.5               | 0.15        |               |                 |                       |
| 69                 | 3.5                     | 0.32 x 45       | 2.5     | 12.0               | 0.2         |               |                 |                       |
| 70                 | 5.5                     | 0.32 x 70       | 3.1     | 14.5               | 0.3         |               |                 |                       |
| 71                 | 8.0                     | 0.45 x 50       | 3.7     | 16.5               | 0.41        |               |                 |                       |
| 72                 | 14.0                    | 0.45 x 88       | 4.9     | 20.0               | 0.64        |               |                 |                       |
| <b>3-Conductor</b> |                         |                 |         |                    |             |               |                 |                       |
| 79 41 76           | 0.75                    | 0.18 x 30       | 1.1     | 9.2                | 0.11        |               |                 |                       |
| 77                 | 1.25                    | 0.18 x 50       | 1.5     | 10.5               | 0.14        |               |                 |                       |
| 78                 | 2.0                     | 0.26 x 37       | 1.8     | 11.0               | 0.18        |               |                 |                       |
| 79                 | 3.5                     | 0.32 x 45       | 2.5     | 13.0               | 0.26        |               |                 |                       |
| 80                 | 5.5                     | 0.32 x 70       | 3.1     | 15.0               | 0.37        |               |                 |                       |
| 81                 | 8.0                     | 0.45 x 50       | 3.7     | 17.5               | 0.51        |               |                 |                       |
| 82                 | 14.0                    | 0.45 x 88       | 4.9     | 22.0               | 0.81        |               |                 |                       |
| <b>4-Conductor</b> |                         |                 |         |                    |             |               |                 |                       |
| 79 41 86           | 0.75                    | 0.18 x 30       | 1.1     | 9.9                | 0.14        |               |                 |                       |
| 87                 | 1.25                    | 0.18 x 50       | 1.5     | 11.5               | 0.18        |               |                 |                       |
| 88                 | 2.0                     | 0.26 x 37       | 1.8     | 12.0               | 0.21        |               |                 |                       |
| 89                 | 3.5                     | 0.32 x 45       | 2.5     | 14.0               | 0.32        |               |                 |                       |
| 90                 | 5.5                     | 0.32 x 70       | 3.1     | 16.5               | 0.46        |               |                 |                       |
| 91                 | 8.0                     | 0.45 x 50       | 3.7     | 19.5               | 0.64        |               |                 |                       |
| 92                 | 14.0                    | 0.45 x 88       | 4.9     | 24.0               | 1.02        |               |                 |                       |

## Parallel P.V.C. Cables

Polyvinylchloride Sheathed 300V or less

Cables Paralelos de P.V.C. ピニール平行ケーブル 双股 PVC 电线

Designed as lighting cord and for indoor wiring. Fixed length is 100 mtrs/coil.



## Cotton Covered Lamp Cables

Rubber and Cotton Sheathed

660V or less – 2 conductors

Cable Eléctrico Forrado en Algodón (para Cafeteras y Planchas)

綿打コード 橡皮及棉线包扎电线

For percolators or pressing irons. Rubber covered wire, cloth taped and cotton sheathed. Fixed length is 100 or 200 mtrs/coil.



| CODE     | mm <sup>2</sup> | Cable Construction mm | CODE     | mm <sup>2</sup> | Cable Construction mm | Unit Per Mtr. |                 |                       |
|----------|-----------------|-----------------------|----------|-----------------|-----------------------|---------------|-----------------|-----------------------|
|          |                 |                       |          |                 |                       | CODE          | mm <sup>2</sup> | Cable Construction mm |
| 79 42 06 | 0.75            | 0.18 x 30             | 79 42 08 | 2.00            | 0.26 x 37             |               |                 |                       |
| 07       | 1.25            | 0.18 x 50             |          |                 |                       |               |                 |                       |

## Flexible Single Cables

P.V.C. Sheathed

300V or less – single conductor

Cables Simple Flexibles

一般機器配線用ケーブル 普通机器配线用 PVC 电线

Single cable with P.V.C. sheath for lighting or wiring indoor or outdoor appliances. Fixed length is 100 mtrs/coil.



| CODE     | mm <sup>2</sup> | Cable Construction mm | CODE     | mm <sup>2</sup> | Cable Construction mm | Unit Per Mtr. |
|----------|-----------------|-----------------------|----------|-----------------|-----------------------|---------------|
| 79 42 11 | 0.5             | 0.18 x 20             | 79 42 13 | 1.25            | 0.18 x 50             |               |
| 12       | 0.75            | 0.18 x 30             | 14       | 2.0             | 0.26 x 37             |               |

## Silicon Rubber and Glass Cloth Sheathed Cables

600V or less, Temperature 180°C or less

Cable Eléctrico Silicona

シリコンゴム絶縁ガラス編組ケーブル 硅胶与绝缘玻璃编织电线

Tin coated annealed copper wire enclosed by silicon rubber and exterior glass cloth sheathing. For generators, electrical tools and various electrical equipment.

| CODE     | mm <sup>2</sup> | O.D. mm | Construction mm | CODE     | mm <sup>2</sup> | O.D. mm | Construction mm | Unit Per Mtr. |
|----------|-----------------|---------|-----------------|----------|-----------------|---------|-----------------|---------------|
| 79 42 26 | 1.25            | 1.5     | 0.18 x 30       | 79 42 28 | 3.5             | 2.5     | 0.18 x 50       |               |
| 27       | 2.0             | 1.8     | 0.26 x 37       | 29       | 5.5             | 3.1     | 0.26 x 37       |               |

## Microphone Cables

Cables para Micrófono マイク・電話線 扩音器及电话用电线

Vinyl covered single wire entirely wrapped by a polyester tape-braided copper armour and an exterior vinyl sheath. Specially used for communication wiring. Fixed length is 100 mtrs/coil.

How to order: CODE

Microphone cable, NUMBER of CONDUCTORS, mm<sup>2</sup>

| CODE               | mm <sup>2</sup> | Out Diam. mm | Cable Construction mm | Unit Per Mtr. |
|--------------------|-----------------|--------------|-----------------------|---------------|
| <b>1-Conductor</b> |                 |              |                       |               |
| 79 42 31           | 0.3             | 3.7          | 0.18 x 12             |               |
| 32                 | 0.5             | 4.6          | 0.18 x 20             |               |
| 33                 | 0.75            | 5.0          | 0.18 x 30             |               |
| 34                 | 1.25            | 5.3          | 0.18 x 50             |               |
| <b>2-Conductor</b> |                 |              |                       |               |
| 79 42 36           | 0.3             | 5.2          | 0.18 x 12             |               |
| 37                 | 0.5             | 6.6          | 0.18 x 20             |               |
| 38                 | 0.75            | 7.4          | 0.18 x 30             |               |
| 39                 | 1.25            | 8.0          | 0.18 x 50             |               |
| <b>3-Conductor</b> |                 |              |                       |               |
| 79 42 41           | 0.3             | 5.5          | 0.18 x 12             |               |
| 42                 | 0.5             | 7.0          | 0.18 x 20             |               |
| 43                 | 0.75            | 7.8          | 0.18 x 30             |               |
| 44                 | 1.25            | 8.4          | 0.18 x 50             |               |
| <b>4-Conductor</b> |                 |              |                       |               |
| 79 42 46           | 0.3             | 5.9          | 0.18 x 12             |               |
| 47                 | 0.5             | 7.4          | 0.18 x 20             |               |
| 48                 | 0.75            | 8.4          | 0.18 x 30             |               |
| 49                 | 1.25            | 9.1          | 0.18 x 50             |               |

## Radio-Frequency Coaxial Cables

Cables Antena Coaxial 高周波同軸ケーブル 高频同轴电缆

For cabling jobs of high frequency equipment. Polyethylene covered wire enclosed by braided copper armour and exterior plastic sheathing. When ordering, specify the code, size of cable and the number of ohms required.



How to order: CODE

Coaxial cable, radio frequency, Ohms, SIZE of CABLE

| CODE              | Size    | Cable mm     |       | O.D.<br>mm | Test<br>Voltage | Unit Per Mtr. |
|-------------------|---------|--------------|-------|------------|-----------------|---------------|
|                   |         | Construction | Diam. |            |                 |               |
| <b>75 ohm (Ω)</b> |         |              |       |            |                 |               |
| 79 42 61          | 1.5C-2V | 0.26 x 1     | 0.26  | 2.9        | 1,000           |               |
| 62                | 2.5C-2V | 0.4 x 1      | 0.4   | 4.0        | 1,000           |               |
| 63                | 3 C-2V  | 0.5 x 1      | 0.5   | 5.4        | 1,000           |               |
| 64                | 5 C-2V  | 0.8 x 1      | 0.8   | 7.4        | 1,000           |               |
| 65                | 7 C-2V  | 0.4 x 7      | 1.2   | 10.4       | 1,000           |               |
| 66                | 10 C-2V | 0.5 x 7      | 1.5   | 13.0       | 1,000           |               |
| <b>50 ohm (Ω)</b> |         |              |       |            |                 |               |
| 79 42 71          | 1.5C-2V | 0.18 x 7     | 0.54  | 2.9        | 300             |               |
| 72                | 2.5C-2V | 0.8 x 1      | 0.8   | 4.3        | 1,000           |               |
| 73                | 3 C-2V  | 0.32 x 7     | 0.96  | 5.3        | 1,000           |               |
| 74                | 5 C-2V  | 1.4 x 1      | 1.4   | 7.3        | 1,000           |               |

### RG Type

Used for transmitting signals for various applications such as digital TV, CCTV, videos, internet radio equipment with higher frequency.



RG-6/U, RG-11/A/U



RG-59/U



RG12/U, RG-58/U



RG-213/U



RG-214/U

| CODE              | Type    | Dimension mm      |            | O.D.<br>mm | Unit Per Mtr. |
|-------------------|---------|-------------------|------------|------------|---------------|
|                   |         | Conductor         | Insulation |            |               |
| <b>75 ohm (Ω)</b> |         |                   |            |            |               |
| 79 42 54          | RG-6/U  | 18AWG (1/1.02mm)  | 4.57       | 6.93       |               |
| 55                | RG-11/A | 14AWG (1/1.63mm)  | 7.11       | 10.20      |               |
| 56                | RG-59/U | 23AWG (1/0.584mm) | 3.7        | 6.10       |               |

**50 ohm (Ω)**

|          |          |                   |      |       |  |
|----------|----------|-------------------|------|-------|--|
| 79 42 57 | RG12/U   | 18AWG (7/0.404mm) | 7.26 | 13.30 |  |
| 58       | RG-58/U  | 20AWG (19/0.18mm) | 2.95 | 4.95  |  |
| 59       | RG-213/U | 13AWG (7/0.75mm)  | 7.25 | 10.30 |  |
| 60       | RG-214/U | 13AWG (7/0.75mm)  | 7.25 | 10.80 |  |

### Armoured Cables

**EP Rubber Insulated, P.V.C. Sheathed & Steel Wire Braided**

**600 V or less – 1 to 12 conductors**

Cable Eléctrico Armado Apantallado Sintético

E.P. ゴム絶縁ビニールシースあじろがい装ケーブル

橡胶绝缘 PVC 电线

For heavy duty wiring on board. Rubber covered wires are entirely wrapped with hemp tape and then enclosed by plastic sheathing and braided metal armour.

**How to order: CODE**

Armoured cable, EP rubber insulated, P.V.C. sheathed & steel wire braided, NUMBER of CONDUCTORS, mm<sup>2</sup>

| CODE               | mm <sup>2</sup> | Cable Strand mm |       | O.D. mm | Kg Per Mtr. | Unit Per Mtr. |
|--------------------|-----------------|-----------------|-------|---------|-------------|---------------|
|                    |                 | Construction    | Diam. |         |             |               |
| <b>1-Conductor</b> |                 |                 |       |         |             |               |
| 79 43 01           | 1.5             | 0.52 x 7        | 1.56  | 7.2     | 0.1         |               |
| 02                 | 2.5             | 0.67 x 7        | 2.01  | 7.6     | 0.12        |               |
| 03                 | 4.0             | 0.85 x 7        | 2.55  | 8.2     | 0.14        |               |
| 04                 | 6.0             | 1.04 x 7        | 3.12  | 8.7     | 0.17        |               |
| 05                 | 10.0            | 1.35 x 7        | 4.05  | 9.9     | 0.225       |               |

(to be continued)

| CODE                | mm <sup>2</sup> | Cable Strand mm |       | O.D. mm | Kg Per Mtr. | Unit Per Mtr. |
|---------------------|-----------------|-----------------|-------|---------|-------------|---------------|
|                     |                 | Construction    | Diam. |         |             |               |
| <b>2-Conductor</b>  |                 |                 |       |         |             |               |
| 79 43 08            | 1.5             | 0.52 x 7        | 1.56  | 11.7    | 0.205       |               |
| 09                  | 2.5             | 0.67 x 7        | 2.01  | 12.8    | 0.250       |               |
| 10                  | 4.0             | 0.85 x 7        | 2.55  | 13.9    | 0.3         |               |
| 11                  | 6.0             | 1.04 x 7        | 3.12  | 15.2    | 0.37        |               |
| 12                  | 10.0            | 1.35 x 7        | 4.05  | 17.1    | 0.49        |               |
| <b>3-Conductor</b>  |                 |                 |       |         |             |               |
| 79 43 15            | 1.5             | 0.52 x 7        | 1.56  | 12.5    | 0.245       |               |
| 16                  | 2.5             | 0.67 x 7        | 2.01  | 13.5    | 0.295       |               |
| 17                  | 4.0             | 0.85 x 7        | 2.55  | 14.7    | 0.365       |               |
| 18                  | 6.0             | 1.04 x 7        | 3.12  | 16.1    | 0.455       |               |
| 19                  | 10.0            | 1.35 x 7        | 4.05  | 18.3    | 0.625       |               |
| <b>4-Conductor</b>  |                 |                 |       |         |             |               |
| 79 43 26            | 1.0             | 0.43 x 7        | 1.29  | 11.2    | 0.205       |               |
| <b>7-Conductor</b>  |                 |                 |       |         |             |               |
| 79 43 27            | 1.0             | 0.43 x 7        | 1.29  | 13.2    | 0.29        |               |
| <b>12-Conductor</b> |                 |                 |       |         |             |               |
| 79 43 28            | 1.0             | 0.43 x 7        | 1.29  | 19.0    | 0.445       |               |
| <b>19-Conductor</b> |                 |                 |       |         |             |               |
| 79 43 29            | 1.0             | 0.43 x 7        | 1.29  | 22.0    | 0.615       |               |

### Enamelled Copper Wire

Hilo de Cobre Esmaltado エナメル銅線  
漆包铜线

For rewinding electric motors, instrument wiring, etc.



Unit Per Kgs.

| CODE     | Diam.<br>mm | Max.<br>Ω/Km<br>at<br>20°C | App.<br>Kg<br>Spool | CODE     | Diam.<br>mm | Max.<br>Ω/Km<br>at<br>20°C | App.<br>Kg<br>Spool | Unit Per Kgs. |
|----------|-------------|----------------------------|---------------------|----------|-------------|----------------------------|---------------------|---------------|
| 79 43 51 | 0.29        | 266.4                      |                     | 79 43 60 | 0.70        | 44.81                      |                     |               |
| 52       | 0.32        | 215.9                      | 10                  | 61       | 0.80        | 34.30                      | 10                  |               |
| 53       | 0.35        | 180.5                      |                     | 62       | 0.90        | 27.10                      |                     |               |
| 54       | 0.40        | 138.1                      | 15                  | 63       | 1.0         | 21.95                      |                     |               |
| 55       | 0.45        | 109.2                      |                     | 64       | 1.2         | 15.24                      |                     |               |
| 79 43 56 | 0.50        | 87.79                      | 10                  | 79 43 65 | 1.4         | 11.20                      | 30                  |               |
| 57       | 0.55        | 72.56                      |                     | 66       | 1.6         | 8.574                      |                     |               |
| 58       | 0.60        | 60.99                      | 15                  | 67       | 1.8         | 6.775                      | 30                  |               |
| 59       | 0.65        | 51.96                      |                     | 68       | 2.0         | 5.487                      |                     |               |

### Antenna Copper Wire

Cable de Cobre para Antena アンテナケーブル 天线铜丝

Specially designed for antenna systems on board vessels.



Unit Per Mtr.

| CODE     | Construction<br>Wire x Strand | O.D.<br>mm | CODE     | Construction<br>Wire x Strand | O.D.<br>mm |
|----------|-------------------------------|------------|----------|-------------------------------|------------|
| 79 43 76 | 1.6 x 19                      | 8.0        | 79 43 78 | 1.6 x 7                       | 4.0        |
| 77       | 1.2 x 19                      | 6.0        |          |                               |            |

### Halogen-free Covered Cables

Cable Libre de Halógeno ハロゲンフリーケーブル 無卤電纜

The remarkably improved fire safety and environmental friendly cables for the ship, not emitting toxic burning fumes or thick smoke owing to Halogen-free insulation cover. Halogen-free refers to the absence of Halogens, such as Chlorine and Fluorine, and they don't emit any harmful Hydraulic Chloride

gas while existing PVC (Polyvinyl Chlorine) dose. In addition to above attractive features, the Halogen-free covered cable reduces cable weight and size to a minimum and still maintain quality, enabling easy installation. The Halogen-free range of cables are flame-retardant (IEC 60332-3).

The following designations are used for insulation materials and sheathing materials, and all materials are halogen-free; Insulation: XLPE stands for Cross-linked Polyethylene compound, and it has excellent mechanical and electrical characteristics. Sheathing: The designation SHF1 stands for Thermoplastic compound, and this material is Halogen-free, highly flame-retardant and has low smoke emission.

The listed cables are for fixed installation on all areas and on open deck in ships. However, if the cable is exposed to direct sun light protective covering or cable with black outer sheath is recommended.

#### **Unarmoured Power and Control Cable 0.6/1 kV HF-CXO**



| Design        |  | IEC 60092-353, design |
|---------------|--|-----------------------|
| 1. Conductor  | - Standard copper conductor                            | IEC 60228. class 2    |
| 2. Insulation | - XLPE plastic   | IEC 60092-351         |
| 3. Bedding    | - Separator tape                                       | -                     |
| 4. Sheath     | - Polyolefine plastic, SHF1<br>- Standard colour Black | IEC 60092-359         |

#### Main Characteristics

|   |  |
|---|--|
| Rated Voltage                             | 0.6/1 kV (1.2 kV)                            |
| Max. Conductor Temperature                | +90°C  |
| Flame-retardant                           | IEC 60332-1-22 Category A                    |
| Halogen-free                              | IEC 60754 series                             |
| Smoke Emission                            | IEC 61034 series                             |
| Min. Recommended Installation Temperature | -15°C  |
| Lowest Operation Temperature              | -40°C  |
| Approvals                                 | ABS / BV / CCS / DNV / KRS / LRS / NK / RINA |

| CODE     | mm <sup>2</sup> | Current Rating Amp | Nom. Outer Diam. mm | Approx. Weight grm/mtr | Unit Per Mtr. |  |
|----------|-----------------|--------------------|---------------------|------------------------|---------------|--|
|          |                 |                    |                     |                        | 1 - Conductor |  |
| 79 42 95 | 1.5             | 23                 | 5.5                 | 40                     |               |  |
| 96       | 2.0             | 40                 | 6.0                 | 52                     |               |  |
| 97       | 4.0             | 51                 | 6.6                 | 70                     |               |  |
| 75       | 6.0             | 52                 | 7.2                 | 90                     |               |  |
| 76       | 10.0            | 72                 | 8.2                 | 135                    |               |  |
| 77       | 16.0            | 96                 | 9.4                 | 205                    |               |  |

#### **1 - Conductor**

|          |      |    |      |     |
|----------|------|----|------|-----|
| 79 42 78 | 1.5  | 20 | 9.0  | 75  |
| 79       | 2.5  | 26 | 10.0 | 110 |
| 80       | 4.0  | 34 | 11.2 | 145 |
| 81       | 6.0  | 44 | 12.5 | 195 |
| 82       | 10.0 | 61 | 14.5 | 315 |

#### **2 - Conductor**

|          |      |    |      |     |
|----------|------|----|------|-----|
| 79 42 83 | 1.5  | 16 | 9.6  | 95  |
| 84       | 2.5  | 21 | 10.7 | 140 |
| 85       | 4.0  | 28 | 11.9 | 190 |
| 86       | 6.0  | 36 | 13.3 | 265 |
| 87       | 10.0 | 50 | 15.5 | 400 |
| 88       | 16.0 | 67 | 18.0 | 635 |

#### **3 - Conductor**

| 4 - Conductor |      |    |      |     |  |
|---------------|------|----|------|-----|--|
| 79 42 89      | 1.5  | 16 | 10.5 | 125 |  |
| 90            | 2.5  | 21 | 11.7 | 170 |  |
| 91            | 4.0  | 28 | 13.4 | 245 |  |
| 92            | 6.0  | 36 | 14.6 | 335 |  |
| 93            | 10.0 | 50 | 17.1 | 515 |  |
| 94            | 16.0 | 67 | 19.9 | 820 |  |

#### **Armoured Power and Control Cable 0.6/1 kV HF-CXOSA**



| Design        | IEC 60092-353, design                                  |
|---------------|--|
| 1. Conductor  | - Standard copper conductor                            |
| 2. Insulation | - XLPE plastic   |
| 3. Bedding    | - Separator Filler tape                                |
| 4. Armour     | - Copper wire braid,<br>- coverage > 90%               |
| 5. Sheath     | - Polyolefine plastic, SHF1<br>- Standard colour Black |

#### Main Characteristics

|   |  |
|---|--|
| Rated Voltage                             | 0.6/1 kV (1.2 kV)                            |
| Max. Conductor Temperature                | +90°C  |
| Flame-retardant                           | IEC 60332-3-22                               |
| Halogen-free                              | IEC 60754 series                             |
| Smoke Emission                            | IEC 61034 series                             |
| Min. Recommended Installation Temperature | -15°C  |
| Lowest Operation Temperature              | -40°C  |
| Approvals                                 | ABS / BV / CCS / DNV / KRS / LRS / NK / RINA |

| CODE     | mm <sup>2</sup> | Cross-section of Armour mm <sup>2</sup> | Current Rating Amp | Nom. Outer Diam. mm | Approx. Weight grm/mtr | Unit Per Mtr. |  |
|----------|-----------------|---|--------------------|---------------------|------------------------|---------------|--|
|          |                 |   |                    |                     |                        | 1 - Conductor |  |
| 79 43 31 | 6.0             | 3.1                                     | 52                 | 8.5                 | 130                    |               |  |
| 32       | 10.0            | 3.2                                     | 71                 | 9.6                 | 175                    |               |  |
| 33       | 16.0            | 4.1                                     | 96                 | 10.7                | 270                    |               |  |

#### **1 - Conductor**

|          |      |     |    |      |     |
|----------|------|-----|----|------|-----|
| 79 43 34 | 1.5  | 3.5 | 20 | 10.4 | 135 |
| 35       | 2.5  | 4.1 | 26 | 11.3 | 170 |
| 36       | 4.0  | 4.5 | 34 | 12.6 | 200 |
| 37       | 6.0  | 5.1 | 44 | 14.3 | 260 |
| 38       | 10.0 | 8.6 | 61 | 16.2 | 400 |

#### **2 - Conductor**

|          |      |      |    |      |     |
|----------|------|------|----|------|-----|
| 79 43 39 | 1.5  | 3.8  | 16 | 10.9 | 160 |
| 40       | 2.5  | 4.3  | 21 | 12.1 | 200 |
| 41       | 4.0  | 4.9  | 28 | 13.2 | 260 |
| 42       | 6.0  | 5.5  | 36 | 15.0 | 335 |
| 43       | 10.0 | 8.8  | 50 | 17.2 | 510 |
| 44       | 16.0 | 10.3 | 67 | 19.7 | 800 |

#### **3 - Conductor**

|                   |                   |
|-------------------|-------------------|
| (to be continued) | (to be continued) |
|-------------------|-------------------|

| CODE                 | mm <sup>2</sup> | Cross-section of Armour mm <sup>2</sup> | Current Rating Amp | Nom. Outer Diam. mm | Unit Per Mtr. |
|----------------------|-----------------|---|--------------------|---------------------|---------------|
| <b>4 - Conductor</b> |                 |   |                    |                     |               |
| 79 43 45             | 1.5             | 4.2                                     | 16                 | 11.9                | 185           |
| 46                   | 2.5             | 4.7                                     | 21                 | 13.0                | 245           |
| 47                   | 4.0             | 5.4                                     | 28                 | 14.9                | 315           |
| 48                   | 6.0             | 8.6                                     | 36                 | 16.3                | 435           |
| 49                   | 10.0            | 9.8                                     | 50                 | 18.7                | 635           |
| 50                   | 16.0            | 11.8                                    | 67                 | 21.5                | 1,000         |

**Unarmoured Switchboard Wire Cable  
0.6/1 kV HFF-CXP**



| Design        |  | IEC 60092-353, design |
|---------------|--|-----------------------|
| 6. Conductor  | - Standard copper conductor                            | IEC 60228, class 2    |
| 7. Insulation | - XLPE plastic   | IEC 60092-351         |
| 8. Bedding    | - Filler tape  | -                     |
| 9. Armour     | - Copper wire braid,<br>- coverage > 90%               | IEC 60092-350         |
| 10. Sheath    | - Polyolefine plastic, SHF1<br>- Standard colour Black | IEC 60092-359         |

**Main Characteristics**

|   |  |
|---|--|
| Rated Voltage                             | 0.6/1 kV (1.2 kV)                            |
| Max. Conductor Temperature                | +90°C  |
| Flame-retardant                           | IEC 60332-1-2                                |
| Halogen-free                              | IEC 60754 series                             |
| Smoke Emission                            | IEC 61034 series                             |
| Min. Recommended Installation Temperature | -15°C  |
| Lowest Operation Temperature              | -40°C  |
| Approvals                                 | ABS / BV / CCS / DNV / KRS / LRS / NK / RINA |

Unit Per Mtr.

| CODE                       | mm <sup>2</sup> | Current Rating Amp | Nom. Outer Diam. mm | Unit Per Mtr. |
|----------------------------|-----------------|--------------------|---------------------|---------------|
| <b>Black - 1 Conductor</b> |                 |                    |                     |               |
| 79 43 06                   | 1.5             | 23                 | 3.1                 | 21            |
| 07                         | 2.0             | 40                 | 3.6                 | 31            |
| 14                         | 4.0             | 51                 | 4.2                 | 47            |
| 20                         | 6.0             | 52                 | 4.9                 | 70            |
| 21                         | 10.0            | 72                 | 5.8                 | 105           |
| 30                         | 16.0            | 96                 | 7.3                 | 161           |

**Blue - 1 Conductor**

|          |     |    |     |    |
|----------|-----|----|-----|----|
| 79 43 69 | 1.5 | 23 | 3.1 | 21 |
| 70       | 2.5 | 40 | 3.6 | 31 |
| 71       | 4.0 | 51 | 4.2 | 47 |
| 72       | 6.0 | 52 | 4.9 | 70 |

**Red - 1 Conductor**

|          |     |    |     |    |
|----------|-----|----|-----|----|
| 79 43 73 | 1.5 | 23 | 3.1 | 21 |
| 74       | 2.5 | 40 | 3.6 | 31 |
| 75       | 4.0 | 51 | 4.2 | 47 |
| 79       | 6.0 | 52 | 4.9 | 70 |

**Yellow - 1 Conductor**

|          |     |    |     |    |
|----------|-----|----|-----|----|
| 79 42 09 | 1.5 | 23 | 3.1 | 21 |
| 10       | 2.5 | 40 | 3.6 | 31 |
| 15       | 4.0 | 51 | 4.2 | 47 |
| 16       | 6.0 | 52 | 4.9 | 70 |

(to be continued)

| <b>Green/Yellow - 1 Conductor</b> |      |    |     |     |   |
|-----------------------------------|------|----|-----|-----|---|
| 79 42 17                          | 1.5  | 23 | 3.1 | 21  | ✓ |
| 18                                | 2.0  | 40 | 3.6 | 31  | ✓ |
| 19                                | 4.0  | 51 | 4.2 | 47  | ✓ |
| 20                                | 6.0  | 52 | 4.9 | 70  | ✓ |
| 30                                | 10.0 | 96 | 5.8 | 105 | ✓ |
| 40                                | 16.0 | 96 | 7.3 | 161 | ✓ |

**Grey - 1 Conductor**

|          |     |    |     |    |   |
|----------|-----|----|-----|----|---|
| 79 42 50 | 1.5 | 23 | 3.1 | 21 | ✓ |
| 51       | 2.5 | 40 | 3.6 | 31 | ✓ |
| 52       | 4.0 | 51 | 4.2 | 47 | ✓ |
| 53       | 6.0 | 52 | 4.9 | 70 | ✓ |

**Brown - 1 Conductor**

|          |     |    |     |    |   |
|----------|-----|----|-----|----|---|
| 79 42 67 | 1.5 | 23 | 3.1 | 21 | ✓ |
| 68       | 2.5 | 40 | 3.6 | 31 | ✓ |
| 69       | 4.0 | 51 | 4.2 | 47 | ✓ |
| 70       | 6.0 | 52 | 4.9 | 70 | ✓ |

**Armoured Telecommunication Cable  
150/250V (300V) HF-IXOSA**



| Design         |  | IEC 60092-353, design |
|----------------|--|-----------------------|
| 11. Conductor  | - Standard copper conductor            | IEC 60228, class 2    |
| 12. Insulation | - XLPE plastic                         | IEC 60092-351         |
| 13. Bedding    | - Filler tape                          | -                     |
| 14. Armour     | - Copper wire braid,<br>coverage > 90% | IEC 60092-350         |
| 15. Sheath     | - Polyolefine plastic, SHF1            | IEC 60092-359         |

**Main Characteristics**

|   |                                       |
|---|---------------------------------------|
| Rated Voltage                             | 150/250V (300V)                       |
| Max. Conductor Temperature                | +90°C                                 |
| Flame-retardant                           | IEC 60332-3-22                        |
| Halogen-free                              | IEC 60754 series                      |
| Smoke Emission                            | IEC 61034 series                      |
| Min. Recommended Installation Temperature | -15°C                                 |
| Lowest Operation Temperature              | -40°C                                 |
| Approvals                                 | ABS / BV / CCS / DNV / KRS / LRS / NK |

Unit Per Mtr.

| CODE     | mm <sup>2</sup> | Current Rating Amp | Nom. Outer Diam. mm | Unit Per Mtr. |
|----------|-----------------|--------------------|---------------------|---------------|
| 79 41 07 | 1 x 2           | 11                 | 8.0                 | 100           |
| 08       | 2 x 2           | 11                 | 11.1                | 150           |
| 09       | 4 x 2           | 11                 | 12.7                | 245           |
| 10       | 7 x 2           | 11                 | 15.5                | 372           |

**0.75 mm<sup>2</sup>**

|          |       |    |      |     |   |
|----------|-------|----|------|-----|---|
| 79 41 07 | 1 x 2 | 11 | 8.0  | 100 | ✓ |
| 08       | 2 x 2 | 11 | 11.1 | 150 | ✓ |
| 09       | 4 x 2 | 11 | 12.7 | 245 | ✓ |
| 10       | 7 x 2 | 11 | 15.5 | 372 | ✓ |

**1.5 mm<sup>2</sup>**

|          |       |    |      |     |   |
|----------|-------|----|------|-----|---|
| 79 41 62 | 1 x 2 | 20 | 9.5  | 110 | ✓ |
| 63       | 2 x 2 | 20 | 13.5 | 200 | ✓ |
| 64       | 4 x 2 | 20 | 16.1 | 325 | ✓ |
| 65       | 7 x 2 | 20 | 19.1 | 470 | ✓ |

## Heavy Electric Cables

### for Crane/Hoist Use

Cables Eléctricos para Grúa/Elevación Gruesos/Pesados  
クレーン用一般電線 吊车 / 起重机用电缆

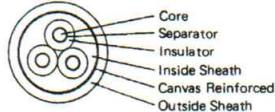
A wide range of models are available. The most common models of standard sizes are described below.

#### 1. Name and Capacity

600V (Test V 3,000V/M)

EP Rubber Insulated and Polychloroprene Sheathed Flexible Power Cable Class - 3

#### 2. Construction



#### 3. Type

1. 600V 3PNCT General Type
2. 600V 3PNCT-B Bendable Type
3. 600V 3PNCT-T Twist Cable Type

#### 4. Specifications

Size: mm

| Binubak Sectional Area mm <sup>2</sup> |                      | 80          | 100         | 125         | 150         | 200         | 250         |
|--|----------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Conductor                              | Number & Dia of Wire | 19/27/ 0.45 | 19/34/ 0.45 | 19/42/ 0.45 | 27/34/ 0.45 | 37/34/ 0.45 | 37/42/ 0.45 |
|  | O.D.                 | 13.5        | 15.2        | 16.8        | 18.7        | 21.2        | 23.6        |
| Insulation Thick                       | 2.1                  | 2.1         | 2.7         | 2.7         | 3.3         | 3.3         |             |
| Canvas Tape Thick                      | 0.5                  | 0.5         | 1.0         | 1.0         | 1.0         | 1.0         |             |
| Single Core                            | Sheath Thick         | 3.4         | 3.5         | 3.7         | 3.8         | 4.1         | 4.2         |
|  | Cable O.D.           | 25.7        | 27.6        | 31.8        | 33.9        | 38.2        | 40.8        |
| Double Core                            | Sheath Thick         | 4.6         | 4.8         | 5.2         | 5.4         | 5.9         | 6.3         |
|  | Cable O.D.           | 47.0        | 50.8        | 57.2        | 61.4        | 69.8        | 75.4        |
| Triple Core                            | Sheath Thick         | 4.8         | 5.0         | 5.4         | 5.7         | 6.2         | 6.6         |
|  | Cable O.D.           | 50.3        | 54.3        | 61.2        | 65.9        | 74.9        | 80.9        |
| Q'dple Core                            | Sheath Thick         | 5.1         | 5.4         | 5.8         | 6.1         | 6.7         | 7.1         |
|  | Cable O.D.           | 55.7        | 60.4        | 68.0        | 73.2        | 83.4        | 90.0        |
| Approx. Weight                         | Single Core          | 1,270       | 1,520       | 1,940       | 2,200       | 2,910       | 3,480       |
|  | Double Core          | 3,490       | 4,190       | 5,280       | 6,030       | 7,980       | 9,590       |
|  | Triple Core          | 4,520       | 5,440       | 6,810       | 7,570       | 10,500      | 12,500      |
|  | Quadruple Core       | 5,660       | 6,840       | 8,560       | 9,840       | 13,200      | 15,700      |

When ordering, please specify the name, capacity, type, number of the core and size of the nominal sectional area.

#### How to order: 79 - 43 - 80

Polychloroprene sheathed EP rubber insulated flexible power cable, type x core x sectional area

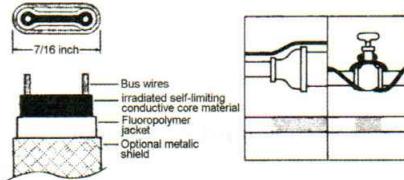
## Self Limiting Parallel Circuit Heaters Auto-Trace

Calentadores Circuitos Paralelos con Limitación Propia Auto-Trace

自己制御型ヒーター 自控式加热器

Auto-Trace is the electrical parallel circuit heat-tracing system. This unique technology enables the heater to vary its power output in response to sensed temperature at every point along its entire circuit. As the temperature increases,

Auto-Trace automatically decreases its heat output, and vice versa. In this way, the heater continually compensates for temperature fluctuations that can lead to system failure with conventional heat tracing methods.



Has the following system features:

1. Full range of heaters for a variety of applications.
2. Complete selection of component and control system.
3. Parallel circuitry for cut-to-length convenience at the jobsite.
4. Flexibility for easy field installation.
5. Self-regulation protects against over-heating at any wattage, even when the heater is overlapped.

From among various types, the most common circuit heaters are listed below.

|      |  |
|------|--|
| BTW  | Electrical heat-tracing for frost protection without steam cleaning. Used for frost protection of pipes and vessels. Also, used for process temperature maintenance up to 65°C.  |
| QTVR | Electrical heat-tracing for process temperature maintenance applications up to 110°C which are not subject to steam cleaning. Used for process temperature maintenance of pipes and vessels. Also, used for frost protection of large pipes and for applications requiring medium temperature exposure capability. |
| KTV  | Electrical heat-tracing for process temperature maintenance applications up to 150°C which may be subject to steam cleaning. Used for process temperature maintenance of pipes and vessels. Also, used for frost protection of large pipes and for applications requiring high temperature exposure capability.    |

These circuit heaters are sold by meter, various spare parts are available as extra accessories. For further information, please write for or ask your supplier for catalogues.

#### How to order: CODE

Parallel circuit heater, self limiting, VOLTAGE, TYPE

Unit Per Mtr.

| 110V              |           | 220V          |          |           |                |
|-------------------|-----------|---------------|----------|-----------|----------------|
| CODE              | Type      | Watt/<br>Foot | CODE     | Type      | W/m<br>at 10°C |
| <b>BTW Series</b> |           |               |          |           |                |
| 79 43 85          | 3BTW1-CR  | 3             | 79 43 98 | 3BTW2-CR  | 9              |
| 81                | 3BTW1-CT  | 3             | 86       | 3BTW2-CT  | 9              |
| 90                | 5BTW1-CR  | 3             | 99       | 5BTW2-CR  | 16             |
| 82                | 5BTW1-CT  | 3             | 87       | 5BTW2-CT  | 16             |
| 79 44 01          | 8BTW1-CR  | 8             | 79 44 05 | 8BTW2-CR  | 25             |
| 02                | 8BTW1-CT  | 8             | 06       | 8BTW2-CT  | 25             |
| 03                | 10BTW1-CR | 10            | 07       | 10BTW2-CR | 29             |
| 04                | 10BTW1-CT | 10            | 08       | 10BTW2-CT | 29             |

(to be continued)

| 110V               |            |               | 220V     |            |                | Unit Per Mtr. |  |
|--------------------|------------|---------------|----------|------------|----------------|---------------|--|
| CODE               | Type       | Watt/<br>Feet | CODE     | Type       | W/m<br>at 10°C |               |  |
| <b>QTVR Series</b> |            |               |          |            |                |               |  |
| 79 44 09           | 10QTVR1-CT | 10            | 79 44 12 | 10QTVR2-CT | 38             |               |  |
| 10                 | 15QTVR1-CT | 15            | 13       | 15QTVR2-CT | 51             |               |  |
| 11                 | 20QTVR1-CT | 20            | 14       | 20QTVR2-CT | 64             |               |  |
| <b>KTV Series</b>  |            |               |          |            |                |               |  |
| 79 44 15           | 5KTV1-CT   | 5             | 79 44 19 | 5KTV2-CT   | 16             |               |  |
| 16                 | 8KTV1-CT   | 8             | 20       | 8KTV2-CT   | 25             |               |  |
| 17                 | 15KTV1-CT  | 15            | 21       | 15KTV2-CT  | 47             |               |  |
| 18                 | 20KTV1-CT  | 20            | 22       | 20KTV2-CT  | 65             |               |  |

Remark: "Watt/Ft" and "W/m at 10°C" is nominal power output.  
CT denotes Fluoropolymer outer jacket.  
CR denotes Modified polyolefin outer jacket.

## Extension Cord Reels

Prolongadores de Cables 延長コードリール 延长线轮

Portable reels which are suitable for use in a work place which is separated from an electrical power source. Available for use with cord lengths from 20 mtrs to 50 mtrs. Contains built in outlets that provide power connections for tools and equipment.



When ordering, please specify the required cord length, voltage, ampere, type of plug and receptacle currently in use so that reel can be used properly with your equipment.

### How to order: CODE

Extension cord reel, VOLTAGE, AMPERE, CORD LENGTH,  
TYPE of PLUG & RECEPTACLE

| Unit Per Set       |             |                    |             |
|--------------------|-------------|--------------------|-------------|
| CODE               | Cord Length | CODE               | Cord Length |
| <b>AC 110 Volt</b> |             | <b>AC 220 Volt</b> |             |
| 79 43 91           | 20 mtr      | 79 43 95           | 20 mtr      |
| 92                 | 30 mtr      | 96                 | 30 mtr      |
| 93                 | 50 mtr      | 97                 | 50 mtr      |

## 18. Cable Accessories

### Cable Terminal Lugs

Terminales Eléctricos de Zapata ターミナルラグ 无绝缘圆头端子

Made of tin-plated copper for conductivity and corrosion resistance. For connecting and terminating wire and easy to install with a crimping tool. Please specify type no. of terminal lugs with cable size to be applied.



### Non-Insulated Round Head

Equivalent to Type "R"  
(See 79 46 51 to 79 46 66).

| CODE     | CableSize<br>mm <sup>2</sup> | Hole Dia<br>mm | Overall Size mm |        | Unit Per Pcs. |
|----------|------------------------------|----------------|-----------------|--------|---------------|
|          |                              |                | Width           | Length |               |
| 79 45 01 | 5.5                          | 8              | 16              | 28     |               |
| 79 45 02 | 8                            | 6              | 12              | 24     |               |
|          |                              | 8              | 15              | 30     |               |
|          |                              | 10             | 15              | 30     |               |
| 79 45 05 | 10                           | 6              | 12              | 29     |               |
| 79 45 06 | 14                           | 8              | 16              | 33     |               |
|          |                              | 10             | 16              | 36     |               |
| 79 45 08 | 16                           | 10             | 18              | 46     |               |

(to be continued)

| CODE     | CableSize<br>mm <sup>2</sup> | Hole Dia<br>mm | Overall Size mm |        | Unit Per Pcs. |
|----------|------------------------------|----------------|-----------------|--------|---------------|
|          |                              |                | Width           | Length |               |
| 79 45 09 | 22                           | 6              | 11.5            | 35     |               |
|          |                              | 7              | 16              | 35     |               |
|          |                              | 8              | 17              | 35     |               |
|          |                              | 10             | 17              | 37     |               |
| 79 45 13 | 25                           | 6              | 14              | 31     |               |
| 79 45 14 | 38                           | 8              | 16              | 38     |               |

### Insulated Eyelet

Equivalent to Type "R-TG"  
(See 79 47 01 to 79 47 12).



| CODE     | CableSize<br>mm <sup>2</sup> | Hole Dia<br>mm | Overall Size mm |        | Colour of PVC<br>Sleeve |
|----------|------------------------------|----------------|-----------------|--------|-------------------------|
|          |                              |                | Width           | Length |                         |
| 79 45 21 | 1.25                         | 4              | 8               | 20     | Red                     |
|          |                              | 3              | 6               | 17     | Blue                    |
|          |                              | 4              | 8               | 21     | Blue                    |
|          |                              | 5              | 9               | 21     | Blue                    |
|          |                              | 6              | 12              | 26     | Blue                    |
|          |                              | 8              | 12              | 25     | Blue                    |
| 79 45 27 | 5.5                          | 4              | 9               | 28     | Yellow                  |
|          |                              | 6              | 12              | 32     | Yellow                  |
|          |                              | 10             | 15              | 35     | Yellow                  |

### Insulated Spade

Equivalent to Type "Y-TG"  
(See 79 47 16 to 79 47 23).



| CODE     | CableSize<br>mm <sup>2</sup> | Hole Dia<br>mm | Overall Size mm |        | Colour of PVC<br>Sleeve |
|----------|------------------------------|----------------|-----------------|--------|-------------------------|
|          |                              |                | Width           | Length |                         |
| 79 45 31 | 1.25                         | 3              | 7               | 20     | Red                     |
|          |                              | 3.5            | 7               | 20     | Red                     |
|          |                              | 4              | 8               | 20     | Blue                    |
| 79 45 33 | 2                            | 4              | 9               | 22     | Yellow                  |
|          |                              | 5              | 9               | 21     | Blue                    |
| 79 45 36 | 5.5                          | 4.5            | 8               | 20     | Blue                    |

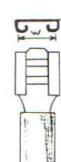
### Insulated Spanner Head

Equivalent to Type "Y-TG"  
(See 79 47 16 to 79 47 23).



| CODE     | CableSize<br>mm <sup>2</sup> | Hole Dia<br>mm | Overall Size mm |        | Colour of PVC<br>Sleeve |
|----------|------------------------------|----------------|-----------------|--------|-------------------------|
|          |                              |                | Width           | Length |                         |
| 79 45 41 | 1.25                         | 4              | 8               | 20     | Red                     |

### Insulated Receptacles



| CODE     | CableSize<br>mm <sup>2</sup> | ILug Width<br>mm | Overall<br>Length mm |        | Colour of PVC<br>Sleeve |
|----------|------------------------------|------------------|----------------------|--------|-------------------------|
|          |                              |                  | Width                | Length |                         |
| 79 45 45 | 1.25                         | 3                | 23                   | 23     | Red                     |
|          |                              | 4                | 23                   | 23     | Red                     |
|          |                              | 6                | 23                   | 23     | Red                     |
| 79 45 48 | 2                            | 5                | 23                   | 23     | Blue                    |
| 79 45 50 | 5.5                          | 6                | 25                   | 25     | Yellow                  |

**Insulated Flat Pins**

Unit Per Pcs.  
CODE Cable Size mm<sup>2</sup> ILug Width mm Overall Length mm Colour of PVC Sleeve  
79 45 61 1.25 2 20 Red  
62 1.25 3 20 Red  
63 2 4 23 Blue  
64 5.5 4 25 Yellow

**Insulated Extension Connectors, Transparent**

Unit Per Pcs.  
CODE Cable Size mm<sup>2</sup> Overall Length mm Colour of PVC Sleeve  
79 45 71 1.25 25 Transparent

**Insulated Butt**

Unit Per Pcs.  
CODE Cable Size mm<sup>2</sup> Overall Length mm Colour of PVC Sleeve  
79 45 75 1.25 23 Red  
76 5.5 27 Yellow

**Insulated Cable Tip**

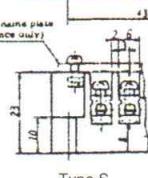
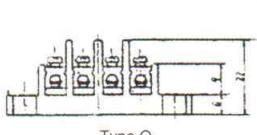
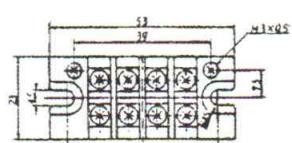
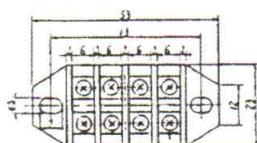
Unit Per Pcs.  
CODE Cable Size mm<sup>2</sup> ILug Width mm Overall Length mm Colour of PVC Sleeve  
79 45 81 1.25 2 21 Red  
82 2 2 21 Blue  
83 5.5 2.5 28 Yellow

**Terminal Boards for Marine Use****Electric Solderless Connecting Terminals**

Cuadro (Placa) de Bornes 船用端子盤 船用接线端板

(Ref. JIS F 8812)

For connecting cables of electric appliances of a rated voltage of 250 V or less. Made of phenol resin. Available in O and S type boards. The O type denotes terminal boards without name plates and the S type denotes terminals with name plates.

**How to order: CODE**

Terminal board, TYPE, AMPERE, NUMBERS of TERMINAL

**"O" Type Terminals**

Unit Per Pcs.

| 10 Ampere |                    |         | 20 Ampere |                    |         |
|-----------|--------------------|---------|-----------|--------------------|---------|
| CODE      | Number of Terminal | Size mm | CODE      | Number of Terminal | Size mm |
| 79 46 01  | 2                  | 23 x 37 | 79 46 06  | 2                  | 26 x 42 |
| 02        | 3                  | 23 x 45 | 07        | 3                  | 26 x 52 |
| 03        | 4                  | 23 x 53 | 08        | 4                  | 26 x 62 |

**"S" Type Terminals**

Unit Per Pcs.

| 10 Ampere |                    |          | 20 Ampere |                    |          |
|-----------|--------------------|----------|-----------|--------------------|----------|
| CODE      | Number of Terminal | Size mm  | CODE      | Number of Terminal | Size mm  |
| 79 46 11  | 2                  | 23 x 37  | 79 46 21  | 2                  | 26 x 40  |
| 12        | 3                  | 23 x 45  | 22        | 3                  | 26 x 50  |
| 13        | 4                  | 23 x 53  | 23        | 4                  | 26 x 60  |
| 14        | 5                  | 23 x 61  | 24        | 5                  | 26 x 74  |
| 15        | 7                  | 23 x 77  | 25        | 7                  | 26 x 94  |
| 16        | 10                 | 23 x 101 | 26        | 10                 | 26 x 137 |
| 17        | 12                 | 23 x 107 | 27        | 12                 | 26 x 157 |

**Separable Terminal Strips**

Regletas Cable Eléctrico 電線端子 电线端子

Solderless, easy handling 12 pole terminals, length can be cut as desired.



Molded



P.V.C. Flexible

**How to order: CODE**

Terminal strip, separated, TYPE, NOMINAL AMPERE

**Molded Strip**

Unit Per Pcs.

| CODE     | Nominal Ampere | Nominal Area mm <sup>2</sup> | Capacity Voltage |
|----------|----------------|------------------------------|------------------|
| 79 46 31 | 10             | 2.5                          | 380              |
| 32       | 25             | 10                           | 380              |
| 33       | 35             | 16                           | 380              |

**P.V.C. Flexible Strip**

Unit Per Pcs.

| CODE     | Nominal Ampere | Nominal Area mm <sup>2</sup> | Capacity Voltage |
|----------|----------------|------------------------------|------------------|
| 79 46 36 | 10             | 2.5                          | 380              |
| 37       | 20             | 6                            | 380              |
| 38       | 25             | 10                           | 380              |
| 39       | 35             | 16                           | 380              |
| 40       | 50             | 25                           | 380              |

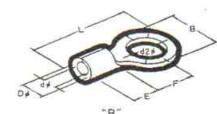
**Cable Shoes**

Terminales Eléctricos Prensado ケーブル シュー 电线端头

Galvanized copper made shoes for connecting cable wires with clamping tools.

**How to order: CODE**

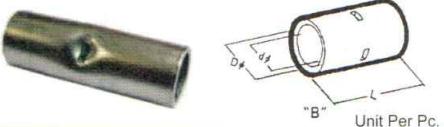
Cable shoe, TYPE, NOMINAL SIZE

**Type "R"**

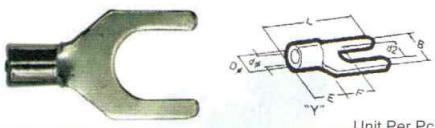
| CODE     | Nominal Size | Size mm |      |      |     | Applicable Twisted Wire mm <sup>2</sup> | Unit Per Pcs. |
|----------|--------------|---------|------|------|-----|---|---------------|
|          |              | d2φ     | B    | L    | Dφ  |   |               |
| 79 46 51 | 1.25 - 3     | 3.2     | 5.5  | 12.0 | 3.4 | 0.25 ~ 1.65                             |               |
| 52       | 1.25 - 4     | 4.3     | 8.0  | 15.6 |     |   |               |
| 53       | 1.25 - 5     | 5.3     |      |      |     |   |               |
| 79 46 54 | 2.0 - 4      | 4.3     | 8.5  | 16.5 | 4.2 | 1.04 ~ 2.63                             |               |
| 55       | 2.0 - 5      | 5.3     | 9.5  | 17.0 |     |   |               |
| 56       | 2.0 - 6      | 6.4     | 12.0 | 21.5 |     |   |               |
| 57       | 2.0 - 8      | 8.4     |      |      |     |   |               |
| 79 46 58 | 5.5 - 4      | 4.3     | 9.5  | 19.5 | 5.6 | 2.63 ~ 6.64                             |               |
| 59       | 5.5 - 5      | 5.3     | 12.0 | 23.0 |     |   |               |
| 60       | 5.5 - 6      | 6.4     |      |      |     |   |               |
| 61       | 5.5 - 8      | 8.4     | 15.0 | 28.0 |     |   |               |
| 62       | 5.5 - 10     | 10.5    |      |      |     |   |               |
| 79 46 63 | 8.0 - 5      | 5.3     | 12.0 | 23.5 | 7.1 | 6.64 ~ 10.52                            |               |
| 64       | 8.0 - 6      | 6.4     |      |      |     |   |               |
| 65       | 8.0 - 8      | 8.4     | 15.0 | 29.5 |     |   |               |
| 66       | 8.0 - 10     | 10.5    |      |      |     |   |               |

Equivalent to Type "Non-Insulated Round Head".  
(See 79 45 01 to 79 45 14)

### Type "B"



### Type "Y"



### Type "R-TG"



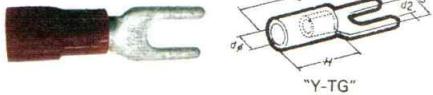
| CODE     | Nominal Size | Size mm |      |      |     | Applicable Twisted Wire mm <sup>2</sup> | Unit Per Pcs. |
|----------|--------------|---------|------|------|-----|---|---------------|
|          |              | d2φ     | B    | L    | dφ  |   |               |
| 79 47 01 | 1.25 - 3     | 3.2     | 5.5  | 17.4 | 3.2 | 0.5 ~ 1.65                              |               |
| 79 47 02 | 1.25 - 4     | 4.3     | 8.0  | 21.0 |     |   |               |
| 79 47 03 | 1.25 - 5     | 5.3     |      |      |     |   |               |
| 79 47 04 | 2.0 - 4      | 4.3     | 8.5  | 21.9 | 3.9 | 1.04 ~ 2.63                             |               |
| 79 47 05 | 2.0 - 5      | 5.3     | 9.5  | 22.4 |     |   |               |
| 79 47 06 | 2.0 - 6      | 6.4     | 12.0 | 26.9 |     |   |               |
| 79 47 07 | 2.0 - 8      | 8.4     |      |      |     |   |               |

(to be continued)

| CODE     | Nominal Size | Size mm |      |      |     | Applicable Twisted Wire mm <sup>2</sup> | Unit Per Pcs. |
|----------|--------------|---------|------|------|-----|---|---------------|
|          |              | d2φ     | B    | L    | dφ  |   |               |
| 79 47 08 | 5.5 - 4      | 4.3     | 9.5  | 27.0 | 5.4 | 2.63 ~ 6.64                             |               |
| 79 47 09 | 5.5 - 5      | 5.3     |      |      |     |   |               |
| 79 47 10 | 5.5 - 6      | 6.4     |      | 30.5 |     |   |               |
| 79 47 11 | 5.5 - 8      | 8.4     | 15.0 | 35.5 |     |   |               |
| 79 47 12 | 5.5 - 10     | 10.5    |      |      |     |   |               |

Equivalent to Type "Insulated Eyelet" (See 79 45 21 to 79 45 29).

### Type "Y-TG"



"Y-TG"

| CODE     | Nominal Size | Size mm |      |      |     | Applicable Twisted Wire mm <sup>2</sup> | Unit Per Pcs. |
|----------|--------------|---------|------|------|-----|---|---------------|
|          |              | d2φ     | B    | L    | dφ  |   |               |
| 79 47 16 | 1.25 - 3L    | 3.7     | 7.7  | 19.4 | 3.2 | 0.5 ~ 1.65                              |               |
| 79 47 17 | 1.25 - 4M    | 4.3     | 8.1  | 21.9 |     |   |               |
| 79 47 18 | 1.25 - 5     | 5.3     | 9.6  | 23.0 |     |   |               |
| 79 47 19 | 2.0 - 4      | 4.3     | 8.0  | 21.5 | 3.9 | 1.04 ~ 2.63                             |               |
| 79 47 20 | 2.0 - 5      | 5.3     |      | 21.4 |     |   |               |
| 79 47 21 | 5.5 - 4      | 4.3     | 9.0  | 25.7 |     |   |               |
| 79 47 22 | 5.5 - 5      | 5.3     |      |      |     |   |               |
| 79 47 23 | 5.5 - 6      | 6.4     | 12.5 | 32.7 |     |   |               |

Equivalent to Type "Insulated Spade" (See 79 45 31 to 79 45 36), and "Insulated Spanner Head" (See 79 45 41).

### Cable Shoe Pliers

Alicates para Terminales 压着ペンチ 电缆终端套管钳子

A tool for pressing cable shoes on electric cables for sizes of 1.25, 2.0, 5.5 and 8 mm<sup>2</sup> in working capacity.  
A must tool for radio repairers and electricians. Length: 250 mm.

61 17 30 Plier, cable shoe 1.25 mm ~ 8 mm sq. Pr.

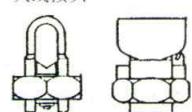


### Antenna Connectors

Sujetacable de Antena アンテナコネクター

天线接头

Brass made antenna connector for ships use.



Unit Per Pcs.

| CODE     | mm <sup>2</sup> | Applicable Antenna Wire |
|----------|-----------------|-------------------------|
| 79 47 41 | 8               | O.D. 2.0 ~ 3.2 mm       |
| 42       | 14              | O.D. 2.0 ~ 5.0 mm       |
| 43       | 22              | O.D. 2.0 ~ 6.0 mm       |
| 44       | 38              | O.D. 2.0 ~ 8.0 mm       |

### Watertight Cable Connectors

Conectores de Cable Estanco 防水電線コネクター 防水电线接头

For connecting cables on deck or any other places where rain, seawater or humidity exists. Interior fixtures are brass sealed inside of a rubber cover.



Unit Per Pcs.

| CODE     | Pole | Ampere | CODE     | Pole | Ampere |
|----------|------|--------|----------|------|--------|
| 79 47 51 | 2    | 15     | 79 47 53 | 3    | 15     |
| 52       | 2    | 20     | 54       | 3    | 20     |

## Welding Cable Connectors

Conectores de cables de soldadura

溶接用ケーブルコネクター

焊接电缆连接器



Brass bar with interior and exterior covered in watertight rubber. Specially designed for welding cable connections.

| CODE     | Ampere | Applicable Cable Size mm | Overall Length mm | Weight grm | Unit Per Pcs. |
|----------|--------|--------------------------|-------------------|------------|---------------|
| 79 47 61 | 300A   | 38 ~ 50                  | 200               | 300        |               |
| 62       | 500A   | 60 ~ 80                  | 295               | 510        |               |
| 63       | 750A   | 100 ~ 125                | 275               | 750        |               |
| 64       | 1,000A | 150 ~ 200                | 300               | 950        |               |

## Cable and Pipe Straps (Saddle)

Grapa Metálica Tipo Puente サドル 线管夹



Iron made saddle used for electric cable or conduit pipes. Also available in plastic upon request.

| CODE     | Applicable Calbe O.D. mm | Pcs Per Box | CODE     | Applicable Calbe O.D. mm | Pcs Per Box | Unit Per Box |
|----------|--------------------------|-------------|----------|--------------------------|-------------|--------------|
| 79 47 71 | 9.8 ~ 12                 | 100         | 79 47 76 | 30 ~ 33                  | 50          |              |
| 72       | 12.5 ~ 14                | 100         | 77       | 38 ~ 41                  | 50          |              |
| 73       | 14.5 ~ 17                | 100         | 78       | 50 ~ 53                  | 20          |              |
| 74       | 18 ~ 20                  | 100         | 79       | 63.5 ~ 67                | 20          |              |
| 75       | 25 ~ 26.5                | 50          | 80       | 76 ~ 79                  | 10          |              |

## Cable Staples

Grapas para Cable Tipo U ステーブル

电线 U 形钉



Plastic insulated WEB cable staples for temporarily stapling indoor cables. Supplied 100 pcs per box.

| CODE     | No. | Applicable Cable         | CODE     | No. | Applicable Cable         | Unit Per Box |
|----------|-----|--------------------------|----------|-----|--------------------------|--------------|
| 79 47 85 | 1   | 1.6 mm <sup>2</sup> x 2C | 79 47 87 | 3   | 2.6 mm <sup>2</sup> x 2C |              |
| 86       | 2   | 2.0 mm <sup>2</sup> x 2C | 88       | 4   | 2.6 mm <sup>2</sup> x 3C |              |

## Cable Clips

Grapa para Cable ケーブルクリップ 电夹



Made of plastic complete with hard plated steel pin, assembled ready for use.

| CODE     | Cable O.D. | CODE     | Cable O.D. | Unit Per Pcs. |
|----------|------------|----------|------------|---------------|
| 79 47 91 | 4 - 7 mm   | 79 47 94 | 16 mm      |               |
| 92       | 7 - 11 mm  | 95       | 18 mm      |               |
| 93       | 10 - 14 mm | 96       | 21 mm      |               |

## Cable Markers

Marcadores para Cable マーキングシート

电线记号板

Temporary or permanent marking for identification of cable after termination. Cloth made with glue on the back for easy application. Specify required number marked 0-9 or alphabet marked A-Z for each sheet or in full set.



|          |  |     |
|----------|--|-----|
| 79 48 01 | Marking number, 0 - 9 each respective sheet      | Pc. |
| 79 48 02 | Marking number, 0 - 9 in full set of 10 sheets   | Set |
| 79 48 03 | Marking alphabet, A - Z each respective sheet    | Pc. |
| 79 48 04 | Marking alphabet, A - Z in full set of 26 sheets | Set |

## Marine Watertight Cable Glands for Electric Appliance

Prensaestopas estancos marinos para aparatos eléctricos

船用防水ケーブルグランド (箱用)

船用防水电缆贯穿导管



Brass, screw type cable glands for watertight electric appliances to be fixed on an enclosure by nut.

| CODE     | Nominal Size mm | Inner Gasket Inside Aiam. mm | Pipe Thread PF | Unit Per Pcs. |
|----------|-----------------|------------------------------|----------------|---------------|
| 79 48 11 | 10              | 7                            | 3/8            |               |
| 12       | 15              | 9                            | 1/2            |               |
| 13       | 20              | 12                           | 3/4            |               |
| 14       | 25              | 16                           | 1              |               |
| 15       | 30              | 22                           | 1-1/4          |               |
| 79 48 16 | 35              | 28                           | 1-1/2          |               |
| 17       | 40              | 32                           | 1-1/2          |               |
| 18       | 45              | 36                           | 2              |               |
| 19       | 50              | 42                           | 2              |               |
| 20       | 55              | 46                           | 2-1/2          |               |
| 79 48 21 | 60              | 52                           | 2-1/2          |               |

## IP 68 Brass and Polyamide Cable Glands

Prensaestopas de latón y poliamida IP 68

IP 68 真鍮およびポリアミド製ケーブルグランド

IP 68 黄铜和聚酰胺电缆接头

Ingress Protection 68, brass and polyamide types are also available for higher watertight protection.



| CODE      | Nominal Size mm | CODE     | Nominal Size mm | Unit Per Pcs. |
|-----------|-----------------|----------|-----------------|---------------|
| Brass     |                 |          |                 |               |
| Polyamide |                 |          |                 |               |
| 79 47 24  | M16 x 1.5       | 79 47 31 | M16 x 1.5       |               |
| 25        | M20 x 1.5       | 32       | M20 x 1.5       |               |
| 26        | M25 x 1.5       | 33       | M25 x 1.5       |               |
| 27        | M32 x 1.5       | 34       | M32 x 1.5       |               |
| 28        | M40 x 1.5       | 35       | M40 x 1.5       |               |
| 79 47 29  | M50 x 1.5       | 79 47 36 | M50 x 1.5       |               |
| 30        | M63 x 1.5       | 37       | M63 x 1.5       |               |

## Explosion Proof Cable Glands for Electric Appliance

Prensaestopas antideflagrantes para aparatos eléctricos

電気機器用防爆型ケーブルグランド 用于电器的防爆电缆接头

Explosion proof cable gland for use indoors, outdoors and hazardous areas. Available for multi armoured or unarmoured cables.



Multi armoured cables



Unarmoured cables

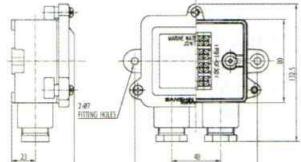
| Specifications           |                 |   |                 | Unit Per Pcs.   |             |                    |          |           |  |
|--------------------------|-----------------|---|-----------------|-----------------|-------------|--------------------|----------|-----------|--|
| Explosion Protection     |                 | IECEx: Ex d I/IIC MbGb, Ex e I/IIC MbGb, Ex nR IIC Gc, Ex tb IIIC Db(Multi armoured)<br>Ex d IIC Gb, Ex e IIC Gb, Ex nR IIC Gc, Ex tb IIIC Db (Unarmoured)<br>ATEX: II 2G, II 2D, II 3G |                 | No. of Terminal | Rated V Amp | No. of Cable Gland | Material | Weight Kg |  |
| Ingress Protection       |                 | IP 65   |                 |                 |             |                    |          |           |  |
| Operating Temperature    |                 | -20°C up to +95°C   |                 |                 |             |                    |          |           |  |
|                          |                 | Unit Per Pcs.   |                 |                 |             |                    |          |           |  |
| CODE                     | Nominal Size mm | CODE  | Nominal Size mm |                 |             |                    |          |           |  |
| For Multi Armoured Cable |                 | For Unarmoured Cable  |                 |                 |             |                    |          |           |  |
| 79 47 45                 | M20             | 79 47 55  | M20             |                 |             |                    |          |           |  |
| 46                       | M25             | 56  | M25             |                 |             |                    |          |           |  |
| 47                       | M32             | 57  | M32             |                 |             |                    |          |           |  |
| 48                       | M40             |   |                 |                 |             |                    |          |           |  |
| 49                       | M50             |   |                 |                 |             |                    |          |           |  |
| 79 47 50                 | M63             |   |                 |                 |             |                    |          |           |  |

## Marine Watertight Joint Boxes

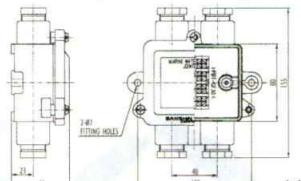
Caja Derivación Estanca 防水接続箱 船用防水接线盒

Marine watertight type joint boxes mainly used for wiring in engine rooms, stores and on decks, etc. Ingress Protection is 56.

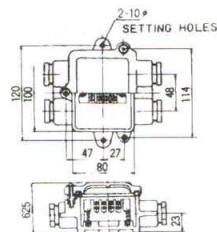
### Plastic



Type 1 (79 48 31)



Type 2 (79 48 32)



Type 2M (79 48 33)

### Brass.



1150



1151



1152 (T)



1153 (+)



1154



1155



1156

| CODE     | Type | No. of Terminal | Rated V | Rated Amp | No. of Cable Gland | Material      | Weight Kg |     |
|----------|------|-----------------|---------|-----------|--------------------|---------------|-----------|-----|
| 79 48 31 | 1    | 3               | 500     | 20        | 2                  | Polycarbonate | 0.40      |     |
|          | 32   | 3               | 500     | 20        | 4                  | Polycarbonate | 0.49      |     |
|          | 33   | 3               | 250     | 20        | 4                  | Phenol Resin  | 0.45      |     |
| 79 52 01 | 1150 | 4               | 500     | 16        | 2                  | Brass         | 0.7       |     |
|          | 02   | 1151            | 4       | 500       | 16                 | 2             | Brass     | 0.6 |
|          | 03   | 1152 (T)        | 4       | 500       | 16                 | 3             | Brass     | 0.7 |
|          | 04   | 1153 (+)        | 4       | 500       | 16                 | 4             | Brass     | 0.8 |
|          | 05   | 1154            | 4       | 500       | 16                 | 3             | Brass     | 0.8 |
|          | 06   | 1155            | 4       | 500       | 16                 | 4             | Brass     | 0.9 |
|          | 07   | 1156            | 4       | 500       | 16                 | 3             | Brass     | 0.8 |

## Explosion Proof Watertight Joint Boxes

Cajas de juntas estancas a prueba de explosiones  
防爆防水ジョイントボックス 防爆防水接头盒

Marine watertight explosion-proof joint boxes are specialized enclosures designed to prevent explosions from igniting surrounding gases or vapors. Made of brass, keep out water, ensuring electrical safety in hazardous environments by containing potential sparks.

| Specifications      |  |   |  |  |  |
|---------------------|--|---|--|--|--|
| Rated Current       |  | 2.5 mm <sup>2</sup> : max. 22 A<br>4.0 mm <sup>2</sup> : max. 30 A<br>6.0 mm <sup>2</sup> : max. 39 A |  |  |  |
| Protection          |  | II 2G EEx e II T6, Zone 1   |  |  |  |
| Temperature         |  | -50°C ~ +100°C  |  |  |  |
| Voltage             |  | Max 690 V   |  |  |  |
| Ignition Protection |  | 67  |  |  |  |



| Unit Per Pcs. |       |                 |         |                    |          |           |
|---------------|-------|-----------------|---------|--------------------|----------|-----------|
| CODE          | Type  | No. of Terminal | Voltage | No. of Cable Gland | Material | Weight Kg |
| 79 52 11      | 510/D | 2               | 690     | 2                  | Brass    | 1.2       |
|               | 12    | 510/2           | 2       | 2                  | Brass    | 1.2       |
|               | 13    | 510/3           | 2       | 3                  | Brass    | 1.3       |
|               | 14    | 510/4           | 2       | 4                  | Brass    | 1.4       |

## Electric Cable Enclosures

### Fiberglass Reinforced Plastic

Caja Derivación Fibra de Vidrio ブルボックス 船用防水接线盒

FRP (Fiberglass Reinforced Plastic) box for treatment of cable end for use indoor and outdoor.



Waterproof and dustproof construction with inner packing.

| CODE     | Size mm W x L x D | CODE     | Size mm W x L x D |
|----------|-------------------|----------|-------------------|
| 79 48 35 | 100 x 100 x 100   | 79 48 38 | 200 x 200 x 100   |
| 36       | 150 x 150 x 100   | 39       | 200 x 200 x 125   |
| 37       | 150 x 150 x 150   |          |                   |

## Cable Guard Channels

### (Cable Trays)

Canaleta Galvanizada Ranurada

ケーブルチャンネル 电缆保险盒



Galvanized iron channeling for cable guard. Standard sizes are listed below.

| Unit Per Pc. |          |           |          |          |           |
|--------------|----------|-----------|----------|----------|-----------|
| CODE         | Width mm | Length mm | CODE     | Width mm | Length mm |
| 79 48 41     | 50       | 1,800     | 79 48 43 | 50       | 1,800     |
| 42           | 75       | 1,800     | 44       | 75       | 1,800     |

## Self Locking Cable Ties

Ataduras de cables autolockantes  
セルフロックケーブルタイ 自锁式电缆扎带

### Plastic

A plastic band designed for bundling wires, hoses, tubing, etc. A stainless steel barb mounted in the head locks the band at any desired diameter.



### Unit: Per Piece

| Unit Per Pc. |           |          |           |
|--------------|-----------|----------|-----------|
| CODE         | Length mm | CODE     | Length mm |
| 79 48 51     | 100       | 79 48 56 | 350       |
| 52           | 150       | 45       | 450       |
| 53           | 200       | 46       | 760       |
| 54           | 250       | 47       | 810       |
| 55           | 300       | 48       | 920       |

### Unit: 100's/Packet

| Unit Per Pkt |           |          |           |
|--------------|-----------|----------|-----------|
| CODE         | Length mm | CODE     | Length mm |
| 79 48 49     | 100       | 79 48 60 | 350       |
| 50           | 150       | 69       | 450       |
| 57           | 200       | 70       | 760       |
| 58           | 250       | 71       | 810       |
| 59           | 300       | 72       | 920       |

### U-V Resistant Type (Per Piece)

Excellent UV (Ultra-Violet) resistant nylon suitable for outdoor use. Temperature range -40° to 180°F.

| Unit Per Pc. |           |          |           |
|--------------|-----------|----------|-----------|
| CODE         | Length mm | CODE     | Length mm |
| 79 48 73     | 100       | 79 48 76 | 250       |
| 74           | 150       | 77       | 300       |
| 75           | 200       | 78       | 350       |

### U-V Resistant Type (100'S/Packet)

| Unit Per Pkt |           |          |           |
|--------------|-----------|----------|-----------|
| CODE         | Length mm | CODE     | Length mm |
| 79 48 79     | 100       | 79 48 86 | 250       |
| 80           | 150       | 87       | 300       |
| 85           | 200       | 88       | 350       |

### Stainless Steel



### Unit: Per Piece

| Unit Per Pc. |           |          |           |
|--------------|-----------|----------|-----------|
| CODE         | Length mm | CODE     | Length mm |
| 79 48 05     | 100       | 79 48 08 | 350       |
| 06           | 150       | 09       | 400       |
| 89           | 200       | 97       | 450       |
| 07           | 250       | 10       | 500       |
| 90           | 300       |          |           |

### Unit: 100's/Packet

| Unit Per Pkt |           |          |           |
|--------------|-----------|----------|-----------|
| CODE         | Length mm | CODE     | Length mm |
| 79 48 22     | 100       | 79 48 27 | 350       |
| 23           | 150       | 28       | 400       |
| 24           | 200       | 29       | 450       |
| 25           | 250       | 30       | 500       |
| 26           | 300       |          |           |

## Cable Tie Gun for Stainless Steel

Herramienta de instalación de bridas de acero inoxidable

ステンレス結束バンド取り付け工具 不锈钢电缆扎带安装工具

A specialized tool to fasten durable stainless steel ties easily and safely. Designed to provide more efficient way of installing stainless steel cable ties with secure and tight grip than manual methods.



|          |   |     |
|----------|---|-----|
| 79 48 40 | Cable tie gun for stainless steel cable tie | Pc. |
|----------|---|-----|

## Antenna Cable Insulators

Aislador de Cable de Antena アンテナ碍子 天线绝缘子

Duralex glass or porcelain insulators specially designed for ship antennas.



### How to order: CODE

Antenna cable insulator, TYPE, MATERIAL, SIZE

| Unit Per Pc. |      |                           |         |
|--------------|------|---------------------------|---------|
| CODE         | Type | Material                  | Size mm |
| 79 48 61     | A    | Porcelain with Galv. Iron | 350 30  |
| 62           |      | Duralex Glass with Brass  |         |
| 79 48 63     | B    |                           | 270 60  |
| 64           |      |                           | 350 90  |
| 79 48 65     | C    | Porcelain                 | 190 50  |
| 66           |      |                           | 250 55  |
| 79 48 67     | D    |                           | 75      |
| 68           |      |                           | 100     |

## Alligator Clips

Pinza Cocodrilo ワニ口クリップ 鳄鱼夹

Plastic covered strong spring clips for wires, etc. Specify the overall length and the colour of the plastic cover, black or red.



### How to order: CODE

Alligator clip, TYPE, OVERALL LENGTH mm, COLOUR

| Unit Per Pc. |                   |          |                   |
|--------------|-------------------|----------|-------------------|
| A-Type       |                   | B-Type   |                   |
| CODE         | Overall Length mm | CODE     | Overall Length mm |
| 79 48 81     | 34                | 79 48 84 | 62                |
| 82           | 50                | -        | -                 |
| 83           | 73                | -        | -                 |

## Banana Pin Plugs

Puntas para Multímetro Tipo "Banana" バナナチップ 栓塞

Coloured plastic with a chromed brass pin. The pin diameter is 4.5 mm. Available in red, black, green, white, yellow and blue, specify when ordering.



| Unit Per Pc. |        |          |        |
|--------------|--------|----------|--------|
| CODE         | Colour | CODE     | Colour |
| 79 48 91     | Red    | 79 48 94 | White  |
| 92           | Black  | 95       | Yellow |
| 93           | Green  | 96       | Blue   |

## 19. Solders

### Quick Rechargeable Soldering Irons

Soldadores Eléctrico Recargables

充電式コードレス半田ゴテ 快充電式电烙铁

A cordless portable soldering iron heated by a nickel cadmium 2.5V rechargeable battery. About 200 soldering jobs can be performed at one time in one hour of quick charging. Separate battery charger operates charging automatically when the iron is placed on it. The pilot lamp of the iron helps when working in dark places. A set includes a charger and two fine tips (No. 7545, No. 7577). For further information, please write or ask for a catalogue.



| CODE     | Description  | Unit Per Pc. |
|----------|--|--------------|
| 79 50 01 | Cordless soldering iron Model No. 7800 with charger AC 110V and 2 spare tips | Set          |
| 79 50 02 | Spare Tip No. 7535 Regular   | Pc.          |
| 03       | Spare Tip No. 7545 Fine  | Pc.          |
| 04       | Spare Tip No. 7546 Heavy   | Pc.          |
| 05       | Spare Tip No. 7566 Micro   | Pc.          |
| 79 50 06 | Charger Ac 110V  | Pc.          |

### Electric Soldering Irons

Soldadores Eléctricos 半田こて 电烙铁

Nickel chromed replaceable elements, insulated with mica and protected by a rugged outer housing. Replaceable tips.



### AC 110V

#### How to order: CODE

Soldering iron, electric, 110 volt, TYPE, WATTAGE

| CODE                | Watts | Top Size mm | Overall Length mm | Unit Per Pc. |
|---------------------|-------|-------------|-------------------|--------------|
| <b>110V I-Round</b> |       |             |                   |              |
| 79 50 11            | 15    | 4 x 76      | 230               |              |
| 12                  | 30    | 5 x 81      | 230               |              |
| 13                  | 60    | 7 x 110     | 410               |              |
| 14                  | 80    | 7 x 110     | 430               |              |
| 15                  | 100   | 9 x 110     | 345               |              |
| 16                  | 150   | 13 x 115    | 350               |              |
| 17                  | 200   | 16 x 125    | 365               |              |
| 18                  | 300   | 19 x 135    | 375               |              |

(to be continued)

#### 110V I-Flat

|          |     |               |     |
|----------|-----|---------------|-----|
| 79 50 21 | 150 | 8 x 33 x 110  | 330 |
| 22       | 200 | 8 x 33 x 110  | 330 |
| 23       | 300 | 15 x 35 x 115 | 350 |
| 24       | 500 | 18 x 40 x 150 | 430 |

#### 110V J-Round

|          |     |          |     |
|----------|-----|----------|-----|
| 79 50 26 | 100 | 9 x 125  | 340 |
| 27       | 150 | 13 x 130 | 340 |
| 28       | 200 | 16 x 145 | 340 |
| 29       | 300 | 19 x 150 | 360 |

#### 110V L-Flat

|          |     |              |     |
|----------|-----|--------------|-----|
| 79 50 31 | 150 | 7 x 31 x 70  | 320 |
| 32       | 200 | 7 x 31 x 70  | 320 |
| 33       | 300 | 15 x 35 x 75 | 335 |
| 34       | 500 | 19 x 41 x 90 | 420 |

#### 110V SG

|          |    |          |     |
|----------|----|----------|-----|
| 79 50 36 | 30 | 1.0 x 25 | 200 |
| 37       | 51 | 1.8 x 37 | 245 |

### AC 220V

#### How to order: CODE

Soldering iron, electric, 220 volt, TYPE, WATTAGE

Unit Per Pc.

| CODE                | Watts | Top Size mm | Overall Length mm |  |
|---------------------|-------|-------------|-------------------|--|
| <b>220V I-Round</b> |       |             |                   |  |
| 79 50 51            | 30    | 5 x 81      | 230               |  |
| 52                  | 60    | 7 x 110     | 308               |  |
| 53                  | 80    | 7 x 110     | 308               |  |
| 54                  | 100   | 9 x 110     | 345               |  |
| 55                  | 150   | 13 x 115    | 350               |  |
| 56                  | 200   | 16 x 125    | 365               |  |
| 57                  | 300   | 19 x 135    | 375               |  |

#### 220V I-Flat

|          |     |               |     |
|----------|-----|---------------|-----|
| 79 50 61 | 150 | 8 x 33 x 110  | 330 |
| 62       | 200 | 8 x 33 x 110  | 330 |
| 63       | 300 | 15 x 35 x 115 | 350 |
| 64       | 500 | 18 x 40 x 150 | 430 |

#### 220V J-Round

|          |     |          |     |
|----------|-----|----------|-----|
| 79 50 66 | 100 | 9 x 125  | 340 |
| 67       | 150 | 13 x 130 | 340 |
| 68       | 200 | 16 x 145 | 340 |
| 69       | 300 | 19 x 150 | 360 |

#### 220V L-Flat

|          |     |              |     |
|----------|-----|--------------|-----|
| 79 50 71 | 150 | 7 x 31 x 70  | 320 |
| 72       | 200 | 7 x 31 x 70  | 320 |
| 73       | 300 | 15 x 35 x 75 | 335 |
| 74       | 500 | 19 x 41 x 90 | 420 |

#### 220V SG

|          |    |          |     |
|----------|----|----------|-----|
| 79 50 76 | 30 | 1.0 x 25 | 200 |
| 77       | 51 | 1.8 x 37 | 245 |

### Electric Soldering Iron Elements

Repuestos para Soldador Eléctrico

半田こてヒーター 电烙铁铁芯

Replacement spare heaters for the aforementioned electric soldering irons.



#### How to order: CODE

Element for electric soldering iron, VOLTAGE, TYPE, WATTAGE

| CODE | Watts | Size mm | Unit Per Pc. |
|------|-------|---------|--------------|
|      |       |         | CODE         |
| 110V |       |         | 220V         |

**I-Round**

|          |     |           |          |
|----------|-----|-----------|----------|
| 79 51 01 | 15  | 12 x 77   | 79 51 31 |
| 02       | 30  | 12 x 83   | 32       |
| 03       | 60  | 16.5 x 70 | 33       |
| 04       | 80  | 16.5 x 70 | 34       |
| 05       | 100 | 25.5 x 80 | 35       |
| 06       | 150 | 25.5 x 80 | 36       |
| 07       | 200 | 32 x 90   | 37       |
| 08       | 300 | 32 x 80   | 38       |

**I-Flat**

|          |     |               |          |
|----------|-----|---------------|----------|
| 79 51 11 | 150 | 98 x 29 x 2   | 79 51 41 |
| 12       | 200 | 68 x 29 x 2   | 42       |
| 13       | 300 | 75 x 33 x 2.5 | 43       |
| 14       | 500 | 95 x 38 x 3   | 44       |

**J-Round**

|          |     |           |          |
|----------|-----|-----------|----------|
| 79 51 16 | 100 | 25.5 x 80 | 79 51 46 |
| 17       | 150 | 25.5 x 80 | 47       |
| 18       | 200 | 32 x 90   | 48       |
| 19       | 300 | 35 x 90   | 49       |

**L-Flat**

|          |     |               |          |
|----------|-----|---------------|----------|
| 79 51 21 | 150 | 68 x 29 x 2   | 79 51 51 |
| 22       | 200 | 68 x 29 x 2   | 52       |
| 23       | 300 | 75 x 33 x 2.5 | 53       |
| 24       | 500 | 95 x 38 x 3   | 54       |

**Resin Cored Soldering Wire**

Hilo Estaño para Soldar やに入り糸半田 树脂心焊丝

Ready for use soldering wire with resin core.  
450 grm spooled.

|          |                                     |      |
|----------|-------------------------------------|------|
| 79 51 70 | Soldering wire resin cored, 450 grm | Spl. |
|----------|-------------------------------------|------|

**Soldering Bars**

Barra Estaño-Plomo para Soldar 棒半田 焊棒



For general soldering work. Contains 50 percent tin and lead.

|          |               |      |
|----------|---------------|------|
| 79 51 72 | Soldering bar | Kgs. |
|----------|---------------|------|

**Soldering Paste**

Pasta para Soldar 半田ペースト 焊膏

Paste flux for all metals except aluminium.  
Takes the place of acid in all soldering jobs. Supplied in 50 grm tins.

|          |                        |     |
|----------|------------------------|-----|
| 79 51 74 | Soldering paste 50 grm | Tin |
|----------|------------------------|-----|

**Soldering Iron Tip Cleaners**

Limpia Portasoldador て先クリーナー 焊枪头清洁器



For removing oxide and cleaning soldering iron tips. Size : 110 x 75 x 25 mm.

|          |                                |     |
|----------|--------------------------------|-----|
| 79 51 76 | Tip cleaner for soldering iron | Pc. |
|----------|--------------------------------|-----|

**Desoldering Guns****(Solder Suckers)**

Desoldador con Bomba 半田吸取器 去焊枪

Hand operated high power suction cleaner ideal for electronic printed circuit board repairing. Overall length 215 mm. Inside diameter of the nozzle is 3 mm.



Desoldering Gun

Spare Nozzle

|          |                                     |     |
|----------|-------------------------------------|-----|
| 79 51 78 | Desoldering gun vacuum suction type | Pc. |
| 79 51 79 | Spare nozzle for desoldering gun    | Pc. |

**20. Electrical Insulation Materials****Ebonite Solid Bars**

Barras Maciza de Ebonita エボナイト棒 硬橡胶棒

Standard length is one meter.



Unit Per Mtr.

| CODE     | Diam. mm | CODE     | Diam. mm | CODE     | Diam. mm |
|----------|----------|----------|----------|----------|----------|
| 79 53 01 | 8        | 79 53 09 | 22       | 79 53 17 | 40       |
| 02       | 10       | 10       | 25       | 18       | 45       |
| 03       | 12       | 11       | 26       | 19       | 50       |
| 04       | 13       | 12       | 28       | 20       | 55       |
| 05       | 15       | 13       | 30       | 21       | 60       |
| 79 53 06 | 16       | 79 53 14 | 32       | 79 53 22 | 65       |
| 07       | 18       | 15       | 35       |          |          |
| 08       | 20       | 16       | 38       |          |          |

**Ebonite Sheets**

Planchas de Ebonita エボナイト板 硬橡胶板



Standard size is 600 x 900 mm. Furnished either full sheet or small cut as required.

**How to order: CODE**

Ebonite sheet, 600 x 900 mm, THICKNESS mm

Unit Per Sh.

| CODE         | Thick mm | CODE     | Thick mm | CODE     | Thick mm |
|--------------|----------|----------|----------|----------|----------|
| 600 x 900 mm |          |          |          |          |          |
| 79 53 31     | 3        | 79 53 36 | 11       | 79 53 41 | 25       |
| 32           | 5        | 37       | 13       | 42       | 30       |
| 33           | 6        | 38       | 15       |          |          |
| 34           | 8        | 39       | 18       |          |          |
| 35           | 10       | 40       | 20       |          |          |

**Bakelite Solid Bars**

Barras Maciza de Baquelita

ベーカライト棒 硬胶木棒



Standard length is one meter.



Unit Per Mtr.

| CODE     | Diam. mm | CODE     | Diam. mm | CODE     | Diam. mm |
|----------|----------|----------|----------|----------|----------|
| 79 53 51 | 8        | 79 53 59 | 22       | 79 53 67 | 40       |
| 52       | 10       | 60       | 25       | 68       | 45       |
| 53       | 12       | 61       | 26       | 69       | 50       |
| 54       | 13       | 62       | 28       | 70       | 55       |
| 55       | 15       | 63       | 30       | 71       | 60       |
| 79 53 56 | 16       | 79 53 64 | 32       | 79 53 72 | 65       |
| 57       | 18       | 65       | 35       |          |          |
| 58       | 20       | 66       | 38       |          |          |

## Bakelite Sheets

Planchas de Bakelite ベークライト板 胶木板

Standard size is 1,000 x 1,000 mm.



### How to order: CODE

Bakelite sheet, 1,000 x 1,000 mm, THICKNESS mm

| Unit Per Sh. |          |          |          |          |          |
|--------------|----------|----------|----------|----------|----------|
| CODE         | Thick mm | CODE     | Thick mm | CODE     | Thick mm |
| 79 53 81     | 0.5      | 79 53 87 | 6        | 79 53 93 | 20       |
| 82           | 1        | 88       | 8        | 94       | 25       |
| 83           | 2        | 89       | 10       | 95       | 30       |
| 84           | 3        | 90       | 12       | 96       | 40       |
| 85           | 4        | 91       | 15       | 97       | 45       |
| 79 53 86     | 5        | 79 53 92 | 18       | 79 53 98 | 50       |

## Insulation Paper

Planchas Cartón Aislante コイル絶縁紙 绝缘纸

Made from 100 % craft pulp for the insulation of electrical instruments. Available in thicknesses from 0.05 to 0.5 mm. Standard width is 450 mm, supplied in rolls of 20 meters.



| Unit Per Mtr. |              |          |          |              |          |
|---------------|--------------|----------|----------|--------------|----------|
| CODE          | Thickness mm | Width mm | CODE     | Thickness mm | Width mm |
| 79 54 01      | 0.05         |          | 79 54 06 | 0.18         |          |
| 02            | 0.08         |          | 07       | 0.25         |          |
| 03            | 0.10         | 450      | 08       | 0.38         | 450      |
| 04            | 0.13         |          | 09       | 0.50         |          |
| 05            | 0.15         |          |          |              |          |

## Artificial Mica Sheets

Planchas de Mica Artificial

人工マイカ板 人工云母片



Size for all sheets is 450 x 900 mm.

| Unit Per Sh. |              |          |              |
|--------------|--------------|----------|--------------|
| CODE         | Thickness mm | CODE     | Thickness mm |
| 79 54 11     | 0.5          | 79 54 14 | 1.6          |
| 12           | 0.8          | 15       | 2.0          |
| 13           | 1.0          |          |              |

## Insulating Mats from Rubber

Alfombrillas aislantes de goma ゴム絶縁マット 橡胶绝缘垫

A rubber insulating mat for added protection when working live or close to live parts. Fully insulating to reduce risk of short circuit up to AC 1,000V and DC 1,500V. Insulation standard: IEC 61112 DIN EN 61112.



| Unit Per Sh. |                |              |         |
|--------------|----------------|--------------|---------|
| CODE         | Size mm        | Thickness mm | Weight  |
| 79 54 16     | 500 x 500      |              | 301 grm |
| 17           | 1,000 x 1,000  | 1.0          | 1.2 kg  |
| 18           | 10,000 x 1,000 |              | 12 kg   |

Ref. Knipex No. 98 67 05 / 98 67 10 / 98 67 15

## Insulation Tapes

Cintas Aislantes 絶縁テープ 绝缘胶带

### Cotton

Cintas de Algodón Aislantes 締テープ 棉絕縁帶

For use in general insulation applications.  
25 mtr roll.



| Unit Per Sp. |          |                 |          |          |                 |
|--------------|----------|-----------------|----------|----------|-----------------|
| CODE         | Width mm | Meter Per Spool | CODE     | Width mm | Meter Per Spool |
| 79 54 21     | 13       | 25              | 79 54 23 | 25       | 25              |
| 22           | 19       | 25              | 24       | 32       | 25              |

### Mica

Cintas de Mica Aislantes マイカテープ 雲母绝缘带

For electrical and heat insulation. 25 mtr roll, 19 mm width.



79 54 27 Tape, mica, insulation, 19mm x 25mtr Rls.

### PVC

Cintas de PVC Aislantes

ビニールテープ P.V.C. 绝缘带

For electrical insulation in domestic and industrial installations, binding, pipe lagging, etc. Available in white, black, blue, red, yellow, green, yellow/green, grey and brown colours. 20 mtr per roll.



| Unit Per Sp. |          |                       |          |          |                 |
|--------------|----------|-----------------------|----------|----------|-----------------|
| CODE         | Width mm | Meter Per Spool (mtr) | CODE     | Width mm | Meter Per Spool |
| Black        |          |                       |          |          |                 |
| 79 54 33     | 19       | 10                    | 79 54 32 | 50       | 20              |
| 79 54 31     | 19       | 20                    |          |          |                 |
| White        |          |                       |          |          |                 |
| 79 54 10     | 19       | 10                    | 79 54 20 | 50       | 20              |
| 79 54 19     | 19       | 20                    |          |          |                 |
| Blue         |          |                       |          |          |                 |
| 79 54 25     | 19       | 10                    | 79 54 28 | 50       | 20              |
| 79 54 26     | 19       | 20                    |          |          |                 |
| Red          |          |                       |          |          |                 |
| 79 54 29     | 19       | 10                    | 79 54 34 | 50       | 20              |
| 79 54 30     | 19       | 20                    |          |          |                 |
| Yellow       |          |                       |          |          |                 |
| 79 54 35     | 19       | 10                    | 79 54 38 | 50       | 20              |
| 79 54 37     | 19       | 20                    |          |          |                 |
| Green        |          |                       |          |          |                 |
| 79 54 39     | 19       | 10                    | 79 54 43 | 50       | 20              |
| 79 54 40     | 19       | 20                    |          |          |                 |
| Yellow-Green |          |                       |          |          |                 |
| 79 54 44     | 19       | 10                    | 79 54 46 | 50       | 20              |
| 79 54 45     | 19       | 20                    |          |          |                 |
| Grey         |          |                       |          |          |                 |
| 79 54 47     | 19       | 10                    | 79 54 49 | 50       | 20              |
| 79 54 48     | 19       | 20                    |          |          |                 |
| Brown        |          |                       |          |          |                 |
| 79 54 50     | 19       | 10                    | 79 54 60 | 50       | 20              |
| 79 54 59     | 19       | 20                    |          |          |                 |

### Rubber

Cintas de Goma Autosoldable ゴム絶縁テープ

橡胶绝缘带

High dielectric strength, moisture proof, water proof, weather resistant, acid and alkali resistant, non corrosive, low temperature resistant, age resistant. For use in the splicing and termination of rubber and plastic insulated cable.



79 54 36 Rubber insulation tape, 20 mm x 10 mtr Rls.

**Empire**

Cintas Aislantes de Lino  
リノテープ 油布绝缘带

Varnished empire or lino tapes for insulation.  
60 mtr roll, if not specified 19 mm width will be furnished.



| CODE     | Width mm | Meter Per Spool | CODE     | Width mm | Meter Per Spool |
|----------|----------|-----------------|----------|----------|-----------------|
| 79 54 41 | 19       | 60              | 79 54 42 | 25       | 60              |

**Electric Teflon Tapes**

Cintas Aislantes (Eléctrico) de Teflón  
電気用テフロンテープ 电气用特氟隆绝缘带



All purpose insulation tape for electrical installations, i.e. condensers, alternators, etc. Tapes wider and thicker than those listed below are available upon request.

**How to order: CODE**

Electric teflon tape, WIDTH, THICKNESS mm

| CODE     | Thick mm | Meter Per Roll | CODE     | Thick mm | Meter Per Roll |
|----------|----------|----------------|----------|----------|----------------|
| 79 54 51 | 0.10     | 10             | 79 54 61 | 0.10     | 10             |
| 52       | 0.13     |                | 62       | 0.13     |                |
| 53       | 0.18     |                | 63       | 0.18     |                |
| 54       | 0.20     |                | 64       | 0.20     |                |
| 55       | 0.25     |                | 65       | 0.25     |                |
| 79 54 56 | 0.30     | 10             | 79 54 66 | 0.30     | 10             |
| 57       | 0.40     |                | 67       | 0.40     |                |
| 58       | 0.50     |                | 68       | 0.50     |                |

**Electric Sleeve Tubes**

Tubos Aislante (Empire, P.V.C., Cristal) チューブ 电气套管



Varnished cloth rolled tube (empire tube)  
length 1 mtr. P.V.C. vinyl tube in various  
colours. Length 50 mtrs. Glass tube  
white colour, Length 1 mtr.

**How to order: CODE**

Electric sleeve tube, KIND of TUBE, INSIDE DIAM mm

| Unit Per Mtr. |                 |          |                 |            |                 |
|---------------|-----------------|----------|-----------------|------------|-----------------|
| Empire Tube   |                 | PVC Tube |                 | Glass Tube |                 |
| CODE          | Inside Diam. mm | CODE     | Inside Diam. mm | CODE       | Inside Diam. mm |
| 79 54 71      | 1               | 79 54 81 | 1               | 79 54 91   | 2               |
| 72            | 3               | 82       | 3               | 92         | 4               |
| 73            | 5               | 83       | 5               | 93         | 6               |
| 74            | 7               | 84       | 7               | 94         | 8               |
| 75            | 9               | 85       | 9               | 95         | 10              |
| 79 54 76      | 11              | 79 54 86 | 11              |            |                 |
| 77            | 13              | 87       | 13              |            |                 |
| 78            | 15              | 88       | 15              |            |                 |

**Heat Release Silicone Rubber Sheet**

Hoja de caucho de silicona de liberación de calor  
熱放射シリコンシート 热辐射硅片



An adhesive silicone rubber sheet to release heat from heat-generating devices such as control panels or other electrical devices efficiently without power consumption.

Suitable for electronic substrates that cannot use heat sink, just put it on electrical systems to prevent overheating. It helps not only saving electricity consumption but also improving the usage environment and extending its operation life. It is made with 3 layers (heat releasing lamia, aluminum lamia, heat conduction lamia) and available in 3 colours (white, black, ivory).

**Specification and Characteristic**

| Material             | Silicon Rubber  |
|----------------------|---|
| Purposes             | Control Panel, Server, etc.   |
| Thickness            | 30 µm (heat releasing lamia)<br>30 µm (aluminum lamia)<br>30 µm (heat conduction lamia) |
| Heat Emissivity      | 0.85<   |
| Thermal Conductivity | 0.7 (W/m·K)   |

| CODE           | Colour | Unit Per Sh.   |
|----------------|--------|----------------|
| 79 54 69<br>70 | Black  | 200 × 300 mm   |
|                |        | 300 × 1,000 mm |
| 79 54 79<br>80 | White  | 200 × 300 mm   |
|                |        | 300 × 1,000 mm |
| 79 54 89<br>90 | Ivory  | 200 × 300 mm   |
|                |        | 300 × 1,000 mm |

**Heat Shrink Plastic Tubing**

Tuberías de plástico de encogimiento por calentamiento  
ヒートシャーリングチューブ 热收缩套管



Used to insulate wires, or to bundle them together, providing abrasion resistance and environmental protection for stranded and solid wire conductors, connections, joints and terminals in electrical work. Shrink tubing will shrink one half of its nominal diameter, and less than 7% of its length, when heated.

Please specify colour of tubing, with nominal size, finish length, material of tubing.

| Nom. Size | Min. Expanded I.D. | Max. Recovered I.D. | Nom. Size | Min. Expanded I.D. | Max. Recovered I.D. |
|-----------|--------------------|---------------------|-----------|--------------------|---------------------|
| 3/64      | 0.046" (1.17mm)    | 0.023" (0.058mm)    | 1/2       | 0.500" (12.70mm)   | 0.250" (6.35mm)     |
| 1/16      | 0.063" (1.60mm)    | 0.031" (0.079mm)    | 3/4       | 0.750" (19.05mm)   | 0.375" (9.53mm)     |
| 3/32      | 0.093" (2.36mm)    | 0.046" (1.17mm)     | 1         | 1.00" (25.40mm)    | 0.500" (12.70mm)    |
| 1/8       | 0.125" (3.18mm)    | 0.062" (1.57mm)     | 1-1/2     | 1.500" (38.10mm)   | 0.750" (19.05mm)    |
| 3/16      | 0.187" (4.75mm)    | 0.093" (2.36mm)     | 2         | 2.000" (50.80mm)   | 1.00" (25.40mm)     |
| 1/4       | 0.250" (6.35mm)    | 0.125" (3.18mm)     | 3         | 3.00" (76.20mm)    | 1.50" (38.10mm)     |
| 3/8       | 0.375" (9.53mm)    | 0.187" (4.75mm)     | 4         | 4.00" (101.60mm)   | 2.00" (50.80mm)     |

**How to order: 79 - 54 - 96**

Tubing, heat shrink, plastic, NOMINAL SIZE, FINISH LENGTH, COLOUR (mtr)

**Insulation Putty****(Neoseal)**

Masilla Dieléctrica 絶縁バテ 绝缘油泥

An insulation sealing compound called "Neoseal". This is a common solution for sealing cable entrances through walls or floors...terminal boxes. Furnished in 1 kg pkts.



|          |                       |      |
|----------|-----------------------|------|
| 79 55 01 | Putty insulation 1 kg | Pkt. |
|----------|-----------------------|------|

## Electric Contact Restorer

Restaurador Contacto Eléctrico 接点復活剤 电接点还原剂

Used for electrical machinery. Cleans contact points with a protective oil film and immediately restores long-lasting, good contact. (Do not apply to relay contacts.) Contains no CFC's (Chlorofluorocarbons).

Unit Per Tin

| CODE | 79 55 05 | 79 55 06 |
|------|----------|----------|
| grm  | 157      | 250      |

## Electric Contact Relay Cleaners

Limpiaadores Contacto Eléctrico "Contact Cleaner"

リレークリーナー 电气接点清洁剂

Cleaner for relay contacts. Simply spray it on contact points. It dissolves and removes film and dirt, to ensure reliable contact. Does not affect metals or resin. Contains no CFC's (Chlorofluorocarbons).

Unit Per Tin

| CODE | 79 55 10 | 79 55 11 |
|------|----------|----------|
| grm  | 100      | 260      |

## Electrical Industry Formula

Fórmula de Industrial Eléctrico Limpiaador

"CRC" 2-26 フォーミュラ 电气工业配方

Prevents malfunction due to the deteriorating effects of moisture and corrosion; extends operational life and reduces down-time and maintenance. Displaces moisture, lubricates and penetrates. Restores and maintains the resistivity of insulating material and improves the conductivity of contacts, commutators, etc. 16 oz aerosols.



|          |  |     |
|----------|--|-----|
| 45 05 91 | Electrical industry formula<br>CRC 2-26, 16 oz tin | Tin |
|----------|--|-----|

## Insulation Varnishes

Barnices Aislantes 絶縁ニス 绝缘漆

For general use with insulation or electrical apparatus. Red and clear types available. Furnished in 300 cc spray tins or 4 ltr liquid cans.

How to order: CODE

Insulation varnish, COLOUR, CONTENTS

| CODE     | Colour | Contents      | Unit |
|----------|--------|---------------|------|
| 79 55 21 | Clear  | Spray, 300 cc | Tin  |
| 79 55 22 |        | Liquid, 4 ltr | Can  |
| 79 55 23 | Red    | Spray, 300 cc | Tin  |
| 79 55 24 |        | Liquid, 4 ltr | Can  |

## Electric Insulation Rubber Gloves

Guantes Aislante Eléctrico de Goma

絶縁ゴム手袋 电气绝缘橡皮手套

Rubber gloves with high dielectric strength.



Unit Per Pr.

| CODE           | Available to   | Tested to         |
|----------------|----------------|-------------------|
| 79 55 31<br>32 | 600V<br>7,000V | 3,000V<br>20,000V |

## 21. Megaphones & Loud Speakers

### Power Megaphones

Megáfonos Powere パワーメガホン Powere 扩音器

High power transistor megaphone for use with R14P (C) or R6P(AA) dry batteries. Megaphones have a well balanced, snug fitting pistol grip. Audible range is approx. 250 mtr or more (JEITA, EIAJ TT-4501A). Dry batteries are sold separately.



How to order: CODE

Megaphone, power, RATED OUTPUT POWER, FUNCTION

| CODE           | Rated Output Power | Batteries   | Audible Distance (JEITA)                           | Size mm                | Funcion   |
|----------------|--------------------|-------------|--|------------------------|-----------|
|                |                    |             |  | Diam. x Length         |           |
| 79 57 01<br>02 | 6W                 | R6P(AA) x 6 | Voice: 250 mtr<br>Voice: 250 mtr<br>Siren: 315 mtr | 154 x 250<br>154 x 250 | -         |
|                | 6W                 | R6P(AA) x 6 | Voice: 250 mtr<br>Siren: 315 mtr                   | 154 x 250              | w/Whistle |
|                | 6W                 | R6P(AA) x 6 | Voice: 250 mtr<br>Siren: 315 mtr                   | 154 x 250              | w/Whistle |
|                | 15W                | R14P(C) x 6 | Voice: 315 mtr                                     | 210 x 346              | -         |

## Reflex Horn Speakers

Altavoces reflex de bocina

リフレックスホーンスピーカー 反射式号角扬声器

Aluminium alloy made loud speakers for fixed installation. Its external speaker component finished with powder coating ensure the unit's weatherproof capability. Large input type speakers as well as spark proof speakers not listed here are also available if required.



|          |          |          |          |
|----------|----------|----------|----------|
| 79 57 11 | 79 57 12 | 79 57 13 | 79 57 14 |
|----------|----------|----------|----------|

| CODE                       | Rated Input Power Watts | OHM At Rated Input Power | Mouth Diam. mm | Material           |
|----------------------------|-------------------------|--------------------------|----------------|--------------------|
| 79 57 11<br>12<br>13<br>14 | 5                       | 2,000                    | 172            | Alum. Alloy,       |
|                            | 10                      | 1,000                    | 172            | Stainless steel    |
|                            | 15                      | 670                      | 400            |                    |
|                            | 30                      | 330                      | 500            | Alum. Alloy, Steel |

## 22. Test Instruments

### Circuit Testers

Comprobador de Corriente サーキットテスター 电路探测器

Industrial quality tester for safe, easy testing of electrical circuits, spark-plugs, motors, fuses, etc. A built in neon lamp glows if the circuit is in order.



| CODE           | Type                | Voltage              |
|----------------|---------------------|----------------------|
| 79 57 21<br>22 | Twin Lead<br>Pencil | 80 - 550<br>80 - 600 |

## Clamp Meters

Pinzas Voltímetro-amperimétricas  
クランプメーター 夹式仪器

Generally a current is measured by closing the clamp meter jaws over the conductor. The specially shaped mating heads of the clamp form a closed magnetic circuit with the cable passing through it.



Unit Per Set

| CODE                              | 79 57 30                                      |   |
|-----------------------------------|---|---|
| Model                             | DCM60R  |   |
| True RMS                          | Yes   |   |
| ACA                               | 199.9/600A                                    | ±(2.0% + 5) 50-60Hz<br>±(2.9% + 5) 60-400Hz |
| ACV                               | 199.9/600V                                    | ±(1.5% + 5) 50-400Hz                        |
| Ω                                 | 199.9Ω  | ±(1.9% + 3)                                 |
| Continuity                        | Buzzer sounds at less than 100Ω               |   |
| Clamp Diameter/<br>Conductor Size | 25 mm / 10 x 30mm                             |   |
| Withstand Voltage                 | Less than AC 3,700 Vrms<br>(Root Mean Square) |   |
| Power Source                      | R-03 (UM-4 or AAA) 1.5V x 2 pc                |   |
| Size / Weight                     | L187 x W50 x H29mm / 210 grm                  |   |
| Name of Mfr.                      | Sanwa Electric Instrument Co., Ltd.           |   |

Unit Per Set

| CODE                              | 79 57 31                                      |  |
|-----------------------------------|---|--|
| Model                             | DCM400  |  |
| ACA                               | 40/400A                                       | ±(1.9% + 5) 50-500Hz<br>±(2.5% + 5) 60-500Hz |
| ACV                               | 400 / 600V                                    | ±(1.5% + 5) 50-500Hz                         |
| DCV                               | 400 / 600V                                    |  |
| Ω                                 | 400Ω  | ± (1% + 2)                                   |
| Frequency (A)                     | 20 - 4k/10k Hz                                |  |
| Frequency (V)                     | 4k/40k/400k/<br>1 MHz                         | ± (0.1% + 1)                                 |
| Continuity                        | Buzzer sounds at less than approx 40Ω         |  |
| Clamp Diameter/<br>Conductor Size | 25 mm / 10 x 34mm                             |  |
| Withstand Voltage                 | Less than AC 3,700 Vrms<br>(Root Mean Square) |  |
| Power Source                      | R-03 (UM-4 or AAA) 1.5V x 2 pc                |  |
| Size / Weight                     | L193 x W50 x H28mm / 230 grm                  |  |
| Name of Mfr.                      | Sanwa Electric Instrument Co., Ltd.           |  |

Unit Per Set

| CODE                  | 79 57 33                     |  |
|-----------------------|------------------------------|--|
| Model                 | 376                          |  |
| True RMS              | Yes                          |  |
| Current AC via jaw    | 0.1 - 999.9A                 |  |
| Voltage AC via iFlex™ | 0.1 - 2,500V                 |  |
| Voltage AC            | 0.1 - 1,000V                 |  |
| Voltage DC            | 0.1mV - 1,000V               |  |
| Resistance            | 0.1 - 60,000Ω                |  |
| Continuity            | Less than 30Ω                |  |
| Jaw Opening           | 34 mm                        |  |
| Power Source          | R6P (UM-3 or AA) 1.5V x 2 pc |  |
| Size mm               | L249 x W85 x H45             |  |
| Weight                | 395 grm                      |  |
| Name of Mfr.          | Fluke (U.K.) Ltd.            |  |

Remark : RMS denotes Remote Mean Square.

## Avo Meters (Testers)

Multimetros 回路計 万用表

These are matched, portable instruments; highly accurate for industrial electricity testing. They are designed to meet the requirements of most industrial test situations.

Carrying cases are available for all models. The specifications listed below are for your reference.



SP-18D



YX-361TR



CX-506a

### How to order: CODE

Avo meter, TYPE, MEASURING RANGE of DCV, ACV, DCA,  
ACA with MANUFACTURER'S NAME & MODEL

Unit Per Set

| CODE            | 79 57 41           | 79 57 42  | 79 57 44   |
|-----------------|--------------------|---|--|
| Model           | SP-18D             | YX-361TR  | CX-506a  |
| Type            | Drop shock proof   | Zero center & continuity LED                              | Universal polarity switching   |
| Measuring Range | DCV                | 300m (5kΩ/v) 3/12/<br>30/120V/600V.<br>(20kΩ/V) ± 3% f.s. | 0.1/0.5/2.5/<br>10/50/250/1,000V<br>(20kΩ/V) ± 2.5% f.s.<br>25kV(w/HV probe) |
|                 | ACV                | 12/30/120/300/<br>600V<br>(9kΩ/V) ± 3% f.s.               | 2.5/10V ± 4% f.s.<br>50/250/1,000V<br>(9kΩ/V) ± 3% f.s.                      |
|                 | DCA                | 60μ/30m/0.3A<br>± 3% f.s.                                 | 50μ/2.5m/25m/<br>0.25A(250mV)<br>± 2.5% f.s.                                 |
|                 | Ω                  | 2k/20k/2MΩ ± 3%<br>of arc.<br>200MΩ ± 5% of<br>arc.       | 2k/20k/200k/2M/<br>20MΩ ± 3%<br>of arc.                                      |
| Power Source    | R6P (1.5V) × 2     | R6P (1.5V) × 2,<br>6F22(9V) × 1                           | R6(1.5V) × 2,<br>6F22(9V) × 1  |
| Size mm         | 159.5 × 129 × 41.5 | 150 × 100 × 37  | 165 × 106 × 46   |
| Weight grm      | 320                | 290   | 370  |

Name of Mfr.: Sanwa Electric Instrument Co.,Ltd.

## Compact System Digital Multi Testers

Multimetros Digitales コンパクトシステムデジタルマルチテスター  
简便数字多用電表

These compact system digital multi-testers cover all basic measuring functions of DC voltage, AC voltage, DC current, AC current and resistance.



79 57 54 / 79 57 55



79 57 56

Unit Per Set

| CODE  | 79 57 54                           | 79 57 55                           | 79 57 56                   |
|-------|------------------------------------|------------------------------------|----------------------------|
| Model | CD771                              | CD772                              | CD800a                     |
| Type  | 4,000 count                        | AC True RMS & Wide current         | 4,000 count display        |
| DCV   | 400mV<br>4/40/400/<br>1,000V       | 400mV<br>4/40/400/<br>1,000V       | 400mV<br>4/40/400/<br>600V |
| ACV   | 4/40/400/<br>1,000V                | 4/40/400/<br>1,000V                | 4/40/400/<br>600V          |
| DCA   | 400μ/4,000μ/<br>40m/400m/<br>4/10A | 400μ/4,000μ/<br>40m/400m/<br>4/15A | 40m/400mA                  |

(to be continued)

|                       | Unit Per Set                              |   |                                 |
|-----------------------|---|---|---------------------------------|
| CODE                  | 79 57 54                                  | 79 57 55                                  | 79 57 56                        |
| Model                 | CD771                                     | CD772                                     | CD800a                          |
| ACA                   | 400μ/4,000μ/<br>40m/400m/<br>4/10A        | 400μ/4,000μ/<br>40m/400m/<br>4/15A        | 40m/400mA                       |
| Resistance            | 400/4k/40k/<br>400k<br>4M/40MΩ            | 400/4k/40k/<br>400k<br>4M/40MΩ            | 400/4k/40k/<br>400kΩ<br>4M/40MΩ |
| Capacitance           | 50n/500n/5μ/<br>50μ/100μF                 | 50n/500n/5μ/<br>50μ/100μF                 | 50/500nF<br>5μ/50/100μF         |
| Frequency             | 5/50/500/5k/<br>50k/100kHz                | 5/50/500/5k/<br>50k/100kHz                | 5Hz – 100kHz                    |
| Over Voltage Category | IEC61010<br>CAT.III 600V<br>CAT.II 1,000V | IEC61010<br>CAT.III 600V<br>CAT.II 1,000V | -                               |
| CE Mark               | Applied                                   | Applied                                   | -                               |
| Power Source          | R6P(1.5V)×2                               | R6P(1.5V) × 2                             | R6P(1.5V) × 2                   |
| Size mm               | H166×W82×<br>D44                          | H166×W82x<br>D44                          | H176xW104x<br>D46               |
| Weight grm            | 360                                       | 360                                       | 340                             |
| Name of Mfr.          | Sanwa Electric Instrument Co.,Ltd.        |   |                                 |

|                   | Unit Per Set  |  |  |
|-------------------|---|--|--|
| CODE              | 79 57 60  | 79 57 67   | 79 57 68   |
| Model             | 115   | 177  | 27II   |
| Type              | True RMS &<br>6,000 count   | True RMS<br>& 6,000 count  | 6,000 count &<br>display mode                          |
| DCV               | 600mV<br>60/600V  | 600mV<br>6/60/600/<br>1,000V   | 600mV<br>6/60/600/<br>1,000V                           |
| ACV               | 600mV<br>6/60/600V  | 600mV<br>6/60/600/<br>1,000V   | 600mV<br>6/60/600/<br>1,000V                           |
| DCA               | 6A/10A<br>continuous or<br>20A overload<br>for 30 seconds<br>maximum  | 60m/400mA<br>6A/10A  | 600μ/6,000μA<br>60mA/400mA/<br>6A/10A                  |
| ACA               | 6A/10A<br>continuous or<br>20A overload<br>for 30 seconds<br>maximum  | 60m/400mA<br>6A/10A  | 600μ/6,000μA<br>60mA/400mA/<br>6A/10A                  |
| Resistance        | 600Ω<br>6k/60k/<br>600kΩ<br>6M/40MΩ   | 600Ω<br>6k/60k/<br>600kΩ<br>6M/50MΩ  | 600Ω<br>6k/60k/<br>600kΩ<br>6M/50MΩ                    |
| Frequency         | 99.99/<br>999.9Hz<br>9.999k/50kHz   | 99.99/<br>999.9Hz<br>9.999k/<br>99.99kHz   | 199.99/<br>1999.9Hz<br>19.999/<br>199.99kHz<br>>200kHz |
| Capacitance       | 1,000nF<br>10μ/100μ/<br>10,000μF  | 1,000nF<br>10μ/100μ/<br>9,999μF  | 10/100nF<br>1/10/100μF<br>9,999μF                      |
| Safety Compliance | ANSI/<br>SA-S82.01-1988,<br>CSA C22.2-<br>1010.1, IEC<br>61010 to<br>1,000V<br>Overvoltage<br>Category III,<br>600V<br>Overvoltage<br>Category IV | ANSI/ISA-<br>S82.02.01,<br>CSA C22.2-<br>1010.1, IEC<br>61010 to<br>1,000V<br>Overvoltage<br>Category III,<br>600V<br>Overvoltage<br>Category IV | IEC 1010-1<br>CAT III/MSHA<br>Approved                 |
| Power Source      | 9V Alkaline battery   | Alkaline battery   | 3 x AA battery   |
| Size mm           | H167xW96x<br>D46  | H185xW90x<br>D43   | H198xW100x<br>D63.5                                    |
| Weight grm        | 350   | 420  | 698.5  |
| Name of Mfr.      | Fluke (U.K.) Ltd.   |  |  |

## Solar-powered Digital Multi Testers

Multimetros Digitales, de Energía Solar  
ソーラー式デジタルテスター 太阳能数字式多用途表

Pocket type and high performance,  
magnesium dioxide lithium secondary  
battery powered with amorphous solar  
battery to store solar energy.



Basic Futures:  
3-3/4 digits 4,000 count / 0.7% best  
accuracy / Range hold / Auto power off  
(15 min.) / Low power ohm (input voltage 0.4V) at continuity  
range / Power saving design.

### Specifications

| Model         | PS8a   |
|---------------|--|
| Type          | Solor powered  |
| DCV           | 400m/4/40/400/500V   |
| ACV           | 4/40/400/500V  |
| Resistance    | 400/4k/40k/400k/4M/40MΩ  |
| Continuity    | Buzzer sounds at less than<br>10-120Ω                                    |
| Bandwidth     | 40 - 400 Hz  |
| Power Source  | Amorphous solar battery + manganese dioxide<br>lithium secondary battery |
| Size mm       | H115 × W57 × D18   |
| Weight grm    | 85   |
| Name of Mfr.: | Sanwa Electric Instrument Co.,Ltd.                                       |
| 79 57 69      | Digital multi tester, solar powered<br>model PS8a                        |
|               | Pc.  |

## Digital Multimeter

Multímetro digital  
デジタルマルチメーター 数字万用表



Pocketable high performance digital multimeter  
that has accurate electrical measurements plus  
temperature, frequency and duty cycle. Also  
easy to use with gloves.

Basic Futures:  
Ideal for Industrial / Commercial applications  
600 V Cat III safety rating.  
6,000 count white LED backlit display Over-voltage indicator  
Diode test, data hold, Auto Power Off

|                         | Unit Per Set                            |  |
|-------------------------|---|--|
| CODE                    | 79 57 70                                |  |
| Model                   | DMM2100                                 |  |
| AC Voltage              | 750 V, accuracy ± (1.0%+3)              |  |
| DC Voltage              | 1,000 V, accuracy± (0.5%+3)             |  |
| AC/DC Current           | 0.1μA to 20A, accuracy ± (1.2%+3)       |  |
| Resistance              | 0.1Ω to 60MΩ, accuracy, ± (1.5%+3)      |  |
| Capacitance             | 0.001nF to 9.999mF, accuracy ± (5.0%+5) |  |
| Frequency               | 0.01Hz to 9.99MHz, accuracy ± (0.1%+2)  |  |
| Duty Cycle              | 1% to 99%, accuracy ± (0.1%+2)          |  |
| Temperature             | 20 to 1,000 °C, accuracy ± (2.5%+5)     |  |
| Diode Test / Continuity | Yes                                     |  |
| Battery                 | 1.5V AA Battery x 2                     |  |
| Size / Weight           | 180 x 90 x 45 mm / 319 grm              |  |
| Name of Mfr.:           | Acision                                 |  |

## Insulation Testers

Medidor Aislamiento 絶縁抵抗計 电阻表

### AC 0 - 600V

A solid state insulation tester. Constructed for the purpose of testing the insulation of household electrical appliances.



#### How to order: CODE

Insulation tester, AC 0 - 600V, TYPE with  
MANUFACTURER'S NAME & MODEL

Unit Per Set

| CODE                  | 79 57 71                               | 79 57 72                                 |
|-----------------------|--|--|
| Model                 | PDM509S                                | DM509S                                   |
| Insulation Resistance | 500V / 100MΩ<br>0.05 - 0.1 - 50 -100MΩ | 500V / 1,000MΩ<br>0.5 - 1 - 500 -1,000MΩ |
| ACV                   | 0 - 600V                               |  |
| DCV                   | 0 - 60V                                |  |
| Power Source          | Alkaline battery 6LR61 (9V) x 1        |  |
| Size mm               | H144 x W99 x D43                       |  |
| Weight grm            | 310                                    |  |
| Name of Mfr.          | Sanwa Electric Instrument Co., Ltd.    |  |

Unit Per Set

| CODE                    | 79 57 74  | 79 57 75                          |
|-------------------------|---|-----------------------------------|
| Model                   | 1503  | 1507                              |
| Insulation Test Range   | 0.1 - 2,000MΩ   | 0.01MΩ- 10GΩ                      |
| Insulation Test Voltage | 500V / 1,000V   | 50V / 100V / 250V / 500V / 1,000V |
| ACV                     | 0.1 - 600V  |                                   |
| DCV                     | 0.1 - 600V  |                                   |
| Standards               | ANSI/ISA 82.02.01 (61010-1) 2004, CAN/CSA-C22.2 No.61010-1-04, and IEC/EN 61010-1 2nd Edition |                                   |
| Over Voltage Category   | Category IV 600V  |                                   |
| Power Source            | Alkaline battery LR6 (1.5V) x 4   |                                   |
| Size mm                 | H203 x W100 x D50   |                                   |
| Weight grm              | 550   |                                   |
| Name of Mfr.            | Fluke (U.K.) Ltd.   |                                   |

### AC 2 - 600V

An all-transistor insulation resistance tester featuring simple push-button, operation. It has a voltmeter scale for measuring AC voltage in addition to insulation resistance. This portable instrument is used for insulation resistance measurement of electrical machines and devices, control and switching equipment, power line and cable wiring, as well as other applications.



#### How to order: CODE

Insulation tester, AC 2 - 600V/ohm rated with  
MANUFACTURER'S NAME & MODEL

Unit Per Set

| CODE                      | 79 57 76  |
|---------------------------|---|
| Model                     | MY600   |
| V/Ω Rated                 | 50V/ 100MΩ<br>100V/ 200MΩ<br>125V/ 250MΩ<br>250V/ 500MΩ<br>500V/2,000MΩ<br>1,000V/4,000MΩ |
| Effective Measuring Range | 0.1 - 4,000MΩ   |
| ACV                       | 2 - 600 V   |
| DCV                       | 2 - 600 V   |
| Resistance                | 0-4,000Ω  |
| Standards                 | EN61557 part1, 2, 4 and 10<br>EN61010 part 1  |
| Over voltage category     | CAT III 600V, CAT II 1,000V   |
| Power Source              | Alkaline battery LR6(1.5V) x 4  |
| Size                      | 156 x 97 x 46 mm  |
| Weight                    | Approx. 490 grm   |
| Name of Mfr.              | Yokogawa Test & Measurement Corporation   |

## Digital Type Insulation Testers

Medidor Aislamiento Digital デジタル式絶縁抵抗計 数字式电阻表

Digital type insulation resistance tester.

Basic features:

Hot-line state (30V minimum) detection / large volt mark with the buzzer sound / Automatic data hold function / Bar graph just like analog meter / Large display with backlight.



#### How to order: CODE

Insulation tester, digital type, TYPE, VOLT/Ohm rated with  
MANUFACTURER'S NAME & MODEL

Unit Per Set

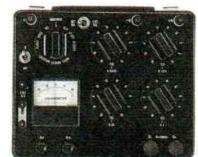
| CODE         | 79 57 81                                    |
|--------------|---|
| Model        | MG500                                       |
| MΩ           | 4M/40M/400M/4,000M ±(3%+4)                  |
| Test Voltage | 500/250/125V                                |
| ACV/DCV      | 600V (AC/DC automatic detection) ±(3%+2)    |
| Ω            | 4,000Ω (Buzzer and alarm indicator) ±(3%+3) |
| Ω            | 40Ω±(3%+10)                                 |
| Battery      | R6 × 6                                      |
| Size mm      | H170 × W142 × D57                           |
| Weight grm   | 600   |
| Accessories  | Test lead, Strap, Instruction manual        |

Name of Mfr.: Sanwa Electric Instrument Co.,Ltd.

## Portable Wheatstone Bridges

Puente Portátil (Wheatstone) de Resistencias

ホイートストンブリッヂ 直流精密抵抗測定器  
精密直流电阻測定器



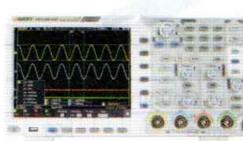
Portable Wheatstone Bridge is convenient for use for general resistance measurement from  $1\Omega$  to  $10\Omega$  with 4 digit accuracy. The built-in galvanometer has taut-band suspension, minimizing the effects of shock.

Since the power source is self-contained, operation is easy and simple. The instrument can be used for field tests, maintenance, and other resistance type measurements.

| Specification            |   |
|--------------------------|---|
| Measuring Range          | $1\Omega$ to $10\text{ Mohm}$ in four digit reading   |
| Minim. Division          | $0.001\Omega$   |
| Accuracy                 | $\pm 0.1\%$ $100\Omega \sim 100\text{ k}\Omega$<br>$\pm 0.3\%$ $10\Omega \sim 1\text{ M}\Omega$<br>$\pm 0.6\%$ $1\Omega \sim 10\text{ M}\Omega$ |
| Galvanometer Sensitivity | $0.9\text{ }\mu\text{A/div.}$   |
| Power Source             | $3 \times 1.5\text{ V R20 (UM-1) Dry Cell}$   |
| Size                     | $H182 \times W226 \times D128\text{ mm}$  |
| Weight                   | 2 kg  |
| 79 58 01                 | Wheatstone bridge, portable<br>$1\Omega$ to $10\text{ M}\Omega$   |
|                          | Set   |

## Oscilloscopes

Osciloskopos オシロスコープ 示波器



An oscilloscope is an electro precision test instrument for detailed observation of the desired portion of complex waveforms. Wide range of models from different manufacturers. An outline of the basic specifications to determine the types of the oscilloscope is listed below. Before ordering, please write for, or ask for a catalogue for further information.

1. Frequency band area : \_\_\_\_\_ MHz
2. Sensitivity : \_\_\_\_\_ mV/div. (1 div. = 10 mm)
3. Power source currency : Alternating current, or Direct current
4. Power source voltage : \_\_\_\_\_ volt
5. Frequency : \_\_\_\_\_ Hz (50 or 60)

### How to order: 79 - 58 - 10

Oscilloscope, with further information as

- (1) Frequency band area,
- (2) Sensitivity,
- (3) AC or DC,
- (4) Power source voltage,
- (5) Frequency, etc.

## 23. Ultrasonic Parts Cleaners

### Ultrasonic Cleaning Equipment

Equipos de limpieza por ultrasonidos

超音波洗净机 超声波清洁设备

It is difficult to remove for the dirt that builds up on cleaning equipment of a complicated design with manual labor.



This product removes the dirt clogging the metal filter by ultrasonic effect neatly quickly.

- The use of ultrasonic power is higher than conventional products therefore it cleans in a shorter time.
- The wave is uniform and prevents cleaning irregularities.
- The cleaning time can be set for various degrees of cleaning.
- There is a removable cleaning basket that makes cleaning easy.
- Its design has a protective lid and other safety devices.

| Unit Per Set                            |   |   |
|---|---|---|
| CODE                                    | 79 58 21  | 79 58 22  |
| Power supply                            | AC 110 V, 50/60 Hz                              | AC 220V, 50/60 Hz   |
| Ultrasonic power                        | 480 W   |   |
| Power consumption                       | 650 W   |   |
| Heater power                            | 300 W   |   |
| Tank capacity                           | 22 Ltr  |   |
| Cleaning time                           | Max. 20 minutes (1 minute increments)           |   |
| Operating environment temperature range | 10–35 °C  |   |
| Material                                | Main body:<br>Tank:<br>Pipes, valves:<br>Panel: | Stainless steel SUS304<br>Stainless steel SUS304<br>Stainless steel SUS304<br>Polypropylene |
| Ultrasonic frequency                    | 38 kHz BLT self-oscillation                     |   |
| Equipment dimensions                    | W568 × D365 × H284 mm                           |   |
| Tank dimension                          | W498 × D295 × H150 mm                           |   |
| Equipment weight                        | 18 kg   |   |

Note: This product is not designed for protection against explosion.

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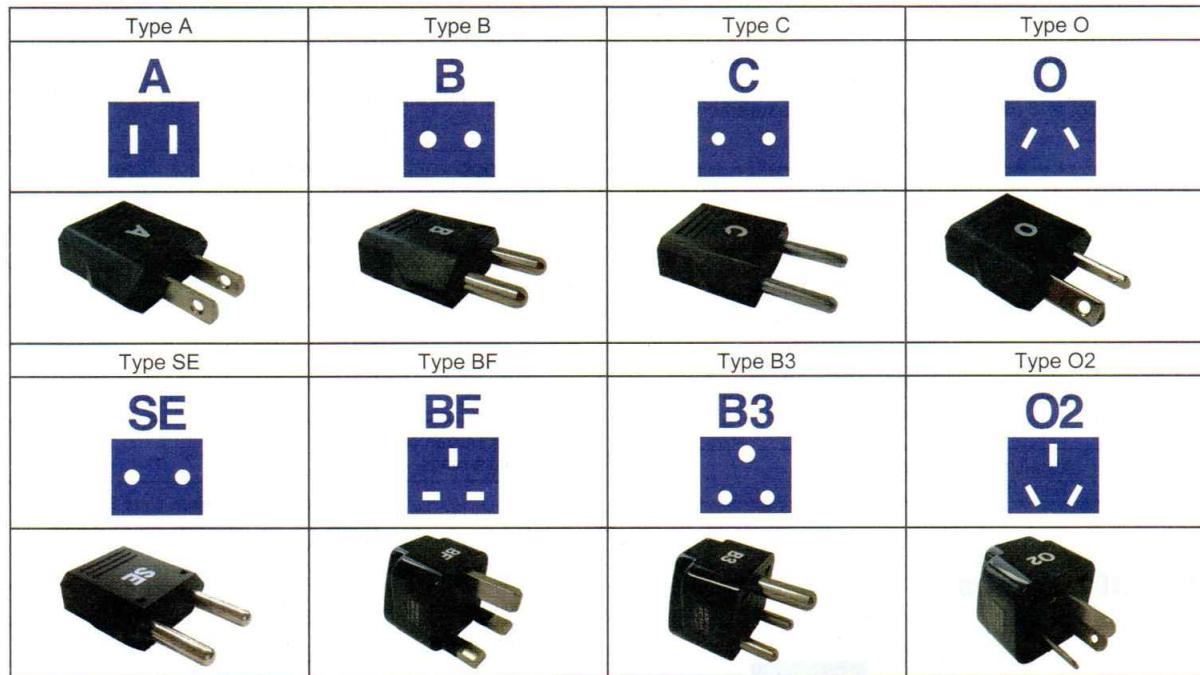
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## Electricity of the World Principal Nation



79

Electrical Equipment

| Country          | Cycle | Voltage     | Plug Type        |
|------------------|-------|-------------|------------------|
| <b>Asia</b>      |       |             |                  |
| Bangladesh       | 50Hz  | 230V        | A/B/C/BF/B3      |
| Bhutan           | 50    | 230         | C                |
| Brunei           | 50    | 240         | BF/B3            |
| Cambodia         | 50    | 120/220     | A/C/BF           |
| China            | 50    | 110/220     | All Types        |
| Hong Kong        | 50    | 200/220     | B/C/BF/B3        |
| India            | 50    | 115/230/240 | B/C/BF/B3/SE     |
| Indonesia        | 50    | 127/220/230 | A/B/C/BF/B3/SE   |
| Japan            | 50/60 | 100         | A                |
| Laos             | 50    | 220         | A/C/SE           |
| Macao            | 50    | 115/127/220 | A/B/C/BF/B3/SE   |
| Malaysia         | 50    | 240         | B/C/BF/B3/SE     |
| Maldives         | 50    | 220         | B/C/BF/B3        |
| Mongolia         | 50    | 220         | B/C/B3/SE        |
| Myanmar          | 50    | 230         | B/C/BF/B3/SE     |
| Nepal            | 50    | 115/220     | A/B/C/BF/B3/SE   |
| N.Korea          | 60    | 100/200/220 | A/B/C/BF/B3/O/SE |
| Pakistan         | 50    | 230         | A/B/C/B3         |
| Philippines      | 60    | 120/230/240 | A/B/C/B3/O       |
| Singapore        | 50    | 115/230     | B/C/BF/B3        |
| S.Korea          | 60    | 220         | C/SE             |
| Sri Lanka        | 50    | 230         | B/C/BF/B3        |
| Taiwan           | 60    | 110/220     | A/C/O            |
| Thailand         | 50    | 220         | A/B/C/BF/B3      |
| Vietnam          | 50    | 110/220     | A/C/BF/SE        |
| <b>Oceania</b>   |       |             |                  |
| Australia        | 50Hz  | 240/250V    | O                |
| Fiji             | 50    | 120/240     | A/B/C/O          |
| Guam             | 50    | 120/240     | A/BF/O           |
| Kiribati         | 50    | 240         | BF/O             |
| Marshall Islands | 60    | 110/220     | A/C/O            |
| Micronesia       | 60    | 110/220     | A/C/O            |
| Nauru            | 50    | 240         | O                |
| New Caledonia    | 50    | 220         | B/C/B3/O/SE      |
| New Zealand      | 50    | 230/240     | O                |
| Niue             | 50    | 220         | O                |
| Palau            | 50    | 110/220     | A/O              |
| Papua            | 50    | 240         | O                |
| New Guinea       |       |             |                  |

| Country              | Cycle | Voltage | Plug Type      |
|----------------------|-------|---------|----------------|
| Samoa                | 50    | 230     | O              |
| Solomon Islands      | 60    | 240     | B/B3/O         |
| Tonga                | 60    | 240     | O              |
| Tuvalu               | 50    | 240     | O              |
| Vanuatu              | 50    | 240     | C/B3/O         |
| <b>North America</b> |       |         |                |
| U.S.A.               | 60Hz  | 120V    | A              |
| Canada               | 60    | 120/240 | A/BF           |
| <b>Europe</b>        |       |         |                |
| Albania              | 50Hz  | 220V    | C/SE           |
| Austria              | 50    | 230     | C/BF/B3/O/SE   |
| Belarus              | 50    | 220     | C              |
| Belgium              | 50    | 127/230 | A/B/C/SE       |
| Bosnia & Herzegovina | 50    | 220     | C/SE           |
| Bulgaria             | 50    | 110/220 | A/C/SE         |
| Croatia              | 50    | 220     | C/SE           |
| Cyprus               | 50    | 240     | C/BF/B3        |
| Czech                | 50    | 230     | C/SE           |
| Denmark              | 50    | 230     | C              |
| Estonia              | 50    | 127/220 | A/C/SE         |
| Finland              | 50    | 120/230 | A/B/C/SE       |
| France               | 50    | 127/230 | A/C/O/SE       |
| Germany              | 50    | 127/230 | A/C/SE         |
| Gibraltar            | 50    | 230/240 | B/C/BF/B3      |
| Greece               | 50    | 230     | B/C/B3/SE      |
| Greenland            | 50    | 220     | C              |
| Hungary              | 50    | 220     | B/C            |
| Iceland              | 50    | 230     | B/C/SE         |
| Italy                | 50    | 125/220 | A/C/SE         |
| Ireland              | 50    | 230     | A/B/C/BF/B3/SE |
| Kazakhstan           | 50    | 127/220 | A/C/SE         |
| Latvia               | 50    | 127/220 | A/C/SE         |
| Lithuania            | 50    | 220     | C              |
| Luxembourg           | 50    | 120/220 | A/C/SE         |
| Macedonia            | 50    | 220     | C/SE           |
| Malta                | 50    | 240     | B/C/BF/B3      |
| Moldova              | 50    | 127/220 | A/C/SE         |
| Monaco               | 50    | 127/220 | A/B/C/SE       |

| Country      | Cycle | Voltage | Plug Type    |
|--------------|-------|---------|--------------|
| Montenegro   | 50    | 220     | C/SE         |
| Netherlands  | 50    | 230     | B/C/SE       |
| Norway       | 50    | 230     | C/SE         |
| Poland       | 50    | 220     | B/C/B3       |
| Portugal     | 50    | 230     | B/C/BF/B3/SE |
| Romania      | 50    | 220     | C/SE         |
| Russia       | 50    | 127/220 | A/B/C/SE     |
| Serbia       | 50    | 220     | C/SE         |
| Slovakia     | 50    | 220     | B/C/SE       |
| Slovenia     | 50    | 220     | C            |
| Spain        | 50    | 127/220 | A/C/SE       |
| Sweden       | 50    | 230     | B/C/SE       |
| Switzerland  | 50    | 230     | A/B/C/SE     |
| Turkmenistan | 50    | 127/220 | A/C/SE       |
| U.K.         | 50    | 230/240 | B/C/BF/B3    |
| Ukraine      | 50    | 127/220 | A/B/C/SE     |
| Uzbekistan   | 50    | 127/220 | A/C/SE       |

## Central/South America

|                           |      |                 |             |
|---------------------------|------|-----------------|-------------|
| Antigua & Barbuda         | 50Hz | 230V            | C/BF/SE     |
| Argentina                 | 60   | 220             | C/BF/O/SE   |
| Bahamas                   | 60   | 120/240         | A/C/BF/SE   |
| Balbados                  | 50   | 110/120/<br>200 | A/B/BF/B3   |
| Belize                    | 60   | 120/240         | A/C/BF/B3   |
| Bolivia                   | 60   | 110/220         | A/C/SE      |
| Brazil                    | 60   | 110/127/<br>220 | A/C/SE      |
| Cayman Islands            | 50   | 120/240         | A/C/BF/B3   |
| Chile                     | 50   | 220             | C/BF/B3/SE  |
| Columbia                  | 50   | 120             | A           |
| Costa Rica                | 50   | 120/240         | A/C/BF/O/SE |
| Cuba                      | 60   | 110/220         | A/B/C/BF    |
| Dominica                  | 50   | 230             | B/BF/B3     |
| Dominican Republic        | 60   | 110/220         | A/C/BF      |
| EI Salvador               | 60   | 110/220         | A/BF/B3     |
| Ecuador                   | 60   | 115/120/<br>220 | A/C/B3/O    |
| Grenada                   | 50   | 230             | C/BF        |
| Guatemala                 | 50   | 120/240         | A/C/BF      |
| Guyana                    | 60   | 110/220         | A/C/BF      |
| Haiti                     | 60   | 110/220         | A/C/BF      |
| Honduras                  | 50   | 110             | A           |
| Jamaica                   | 50   | 110/220         | A/C/BF/B3   |
| Mexico                    | 50   | 120/127/<br>230 | A/C/SE      |
| Nicaragua                 | 60   | 120/240         | A/BF        |
| Panama                    | 60   | 120/240         | A/BF        |
| Paraguay                  | 50   | 220             | A/C/SE      |
| Peru                      | 60   | 220             | A/C/SE      |
| Puerto Rico               | 60   | 120/240         | A/C/BF      |
| St. Christopher and Nevis | 60   | 230             | C/BF/B3     |
| Saint Lucia               | 50   | 240             | C/BF        |
| Suriname                  | 60   | 127             | C/SE        |
| Trinidad & Tobago         | 60   | 115/230         | A/BF/O      |
| Uruguay                   | 50   | 220             | C/BF/B3     |
| Venezuela                 | 60   | 120             | A           |

## Middle East

|              |      |         |                |
|--------------|------|---------|----------------|
| Afghanistan  | 50Hz | 220V    | B/C/B3/SE      |
| Bahrain      | 50   | 110/230 | A/BF           |
| Iran         | 50   | 230     | C/BF/SE        |
| Iraq         | 50   | 220     | B/C/BF/B3/SE   |
| Israel       | 50   | 230     | C/O/SE         |
| Jordan       | 50   | 220     | B/BF/B3        |
| Lebanon      | 50   | 110/220 | A/C            |
| Oman         | 50   | 230     | B/C/BF/B3      |
| Qatar        | 50   | 240     | BF             |
| Quwait       | 50   | 240     | B/C/B3/SE      |
| Saudi Arabia | 50   | 127/220 | A/B/C/BF/B3/SE |
| Syria        | 50   | 220     | B/C/B3/SE      |
| Turkey       | 50   | 220     | B/C/B3/SE      |
| U.A.E.       | 50   | 220/240 | B/C/BF/B3      |
| Yemen        | 50   | 230     | C/B3           |

| Country                        | Cycle | Voltage         | Plug Type    |
|--------------------------------|-------|-----------------|--------------|
| Africa                         |       |                 |              |
| Algeria                        | 50Hz  | 127/220V        | A/C/BF       |
| Angola                         | 50    | 220             | B/C/B3       |
| Benin                          | 50    | 120/220         | A/B/C/B3/SE  |
| Botswana                       | 50    | 220             | B/C/BF/B3    |
| Burkina Faso                   | 50    | 220             | B/C/SE       |
| Burundi                        | 50    | 220             | B/C/B3/SE    |
| Cameroon                       | 50    | 127/220         | A/C/BF       |
| Canary Islands                 | 50    | 127/220         | A/C          |
| Central Africa                 | 50    | 220             | B/C/B3/SE    |
| Chad                           | 50    | 220             | C            |
| Congo, Democratic Republic     | 50    | 220             | C            |
| Congo, Republic                | 50    | 220             | B/C          |
| Cote D'Ivoire                  | 50    | 220             | B/C/B3       |
| Djibouti                       | 50    | 220             | C            |
| Egypt                          | 50    | 220             | C/BF/B3/SE   |
| Ethiopia                       | 50    | 220             | C            |
| Gabon                          | 50    | 220             | C/BF/SE      |
| Gambia                         | 50    | 230             | C/BF/B3      |
| Ghana                          | 50    | 220/230/<br>240 | C/BF/B3      |
| Guinea, Republic               | 50    | 220             | B/C          |
| Guinea, Republic of Equatorial | 50    | 220             | B/C/BF       |
| Kenya                          | 50    | 240             | B/C/BF/B3    |
| Lesotho                        | 50    | 220             | C/B3         |
| Liberia                        | 50    | 120/240         | A/C/B3/SE    |
| Libya                          | 50    | 127/230         | A/C/B3       |
| Madagascar                     | 50    | 110/220         | A/C/B3       |
| Malawi                         | 50    | 230             | C/BF/B3      |
| Mali                           | 50    | 220             | C/SE         |
| Mauritania                     | 50    | 220             | C/SE         |
| Mauritius                      | 50    | 230             | B/C/BF/B3/SE |
| Morocco                        | 50    | 115/127/<br>220 | A/C/SE       |
| Mozambique                     | 50    | 220             | C/B3/SE      |
| Niger                          | 50    | 220             | B/C/B3/SE    |
| Nigeria                        | 50    | 230             | B/C/BF/B3    |
| Rwanda                         | 50    | 110/220         | A/C/SE       |
| Saint Helena                   | 50    | 240             | C/BF/B3      |
| Senegal                        | 50    | 127/220         | A/C/B3/SE    |
| Seychelles                     | 50    | 230             | C/BF         |
| Sierra Leone                   | 50    | 230             | B/C/BF/B3    |
| Somalia                        | 50    | 110/220/<br>230 | A/C/BF/B3    |
| South Africa                   | 50    | 220/230/<br>250 | B/C/BF/B3    |
| Sudan                          | 50    | 220/240         | C/BF/B3      |
| Swaziland                      | 50    | 230             | B/C/B3       |
| Togo                           | 50    | 220             | B/C/BF       |
| Tanzania                       | 50    | 230             | C/BF/B3      |
| Tunisia                        | 50    | 127/220         | All Types    |
| Uganda                         | 50    | 240             | C/BF         |
| Zambia                         | 50    | 230             | B/C/BF/B3    |
| Zimbabwe                       | 50    | 220             | C/BF/B3      |

## Conversion Table

| [Length] | m               | km                     | in                  | ft    | yd    | mile                   |
|----------|-----------------|------------------------|---------------------|-------|-------|------------------------|
| m        | 1               | $1 \times 10^{-3}$     | 39.37               | 3.28  | 1.093 | $6.214 \times 10^{-4}$ |
| km       | $1 \times 10^3$ | 1                      | $3.937 \times 10^4$ | 3,280 | 1,093 | 0.621                  |
| in       | 0.0254          | $2.54 \times 10^{-5}$  | 1                   | 1/12  | 1/36  | $1.58 \times 10^{-5}$  |
| ft       | 0.305           | $3.048 \times 10^{-4}$ | 12                  | 1     | 1/3   | $1.894 \times 10^{-4}$ |
| yd       | 0.914           | $9.144 \times 10^{-4}$ | 36                  | 3     | 1     | $5.682 \times 10^{-4}$ |
| mile     | 1,609           | 1.609                  | 63,360              | 5,280 | 1,760 | 1                      |

| [Mass (Weight)] | g               | kg                 | t                      | lb                     | oz     |
|-----------------|-----------------|--------------------|------------------------|------------------------|--------|
| g               | 1               | $1 \times 10^{-3}$ | $1 \times 10^{-6}$     | $2.204 \times 10^{-3}$ | 0.0352 |
| kg              | $1 \times 10^3$ | 1                  | $1 \times 10^{-3}$     | 2.204                  | 35.27  |
| t               | $1 \times 10^6$ | $1 \times 10^3$    | 1                      | 2,204                  | 35,270 |
| lb              | 453.6           | 0.4536             | $4.536 \times 10^{-4}$ | 1                      | 16     |
| oz              | 28.35           | 0.02835            | $2.835 \times 10^{-5}$ | 1/16                   | 1      |

| [Volume]                   | cm <sup>3</sup><br>(cc or ml) | m <sup>3</sup> | l      | in <sup>3</sup> | qt      | pt     | fl-oz  | ft <sup>3</sup> | gal     |
|----------------------------|-------------------------------|----------------|--------|-----------------|---------|--------|--------|-----------------|---------|
| cm <sup>3</sup> (cc or ml) | 1                             | 0.000001       | 0.001  | 0.061           | 0.00088 | 0.0018 | 0.035  | -               | 0.00022 |
| m <sup>3</sup>             | 1,000,000                     | 1              | 1,000  | 61,024          | 880     | 1,760  | 35,195 | 35.314          | 220     |
| l                          | 1,000                         | 0.001          | 1      | 61.024          | 0.880   | 1.760  | 35.195 | 0.035           | 0.220   |
| in <sup>3</sup>            | 16.387                        | 0.000016       | 0.016  | 1               | 0.014   | 0.029  | 0.577  | 0.00058         | 0.0036  |
| qt                         | 1,136.52                      | 0.0011         | 1.137  | 69.355          | 1       | 2      | 40     | 0.033           | 0.25    |
| pt                         | 568                           | 0.00057        | 0.568  | 34.677          | 0.5     | 1      | 20     | 0.017           | 0.125   |
| fl-oz                      | 28.413                        | 0.000028       | 0.028  | 1.734           | 0.025   | 0.05   | 1      | 0.0008          | 0.00625 |
| ft <sup>3</sup>            | 28,316                        | 0.0283         | 28.316 | 1,728           | 29.922  | 59.844 | 958    | 1               | 7,481   |
| gal                        | 4,546                         | 0.0045         | 4.546  | 277             | 4       | 8      | 160    | 0.134           | 1       |

| [Pressure]          | bar                | kgf/cm <sup>2</sup>   | lbf/cm <sup>2</sup>   | mmHg (0°C)            | Pa (SI) |
|---------------------|--------------------|-----------------------|-----------------------|-----------------------|---------|
| bar                 | 1                  | 1.020                 | 14.50                 | 750.1                 | 100,000 |
| kgf/cm <sup>2</sup> | 0.9807             | 1                     | 14.22                 | 753.6                 | 98,066  |
| lbf/cm <sup>2</sup> | 0.0689             | 0.0703                | 1                     | 51.72                 | 6,895   |
| mmHg (0°C)          | 0.00133            | 0.0013                | 0.0193                | 1                     | 133.3   |
| Pa (SI)             | $1 \times 10^{-5}$ | $1.02 \times 10^{-5}$ | $1.45 \times 10^{-4}$ | $10.2 \times 10^{-4}$ | 1       |

| [Stress]            | Pa (SI)               | MPa                      | kgf/mm <sup>2</sup>      | kgf/cm <sup>2</sup>      |
|---------------------|-----------------------|--------------------------|--------------------------|--------------------------|
| Pa (SI)             | 1                     | $1 \times 10^{-6}$       | $1.01972 \times 10^{-7}$ | $1.01972 \times 10^{-5}$ |
| MPa                 | $1 \times 10^6$       | 1                        | $1.01972 \times 10^{-1}$ | $1.01972 \times 10$      |
| kgf/mm <sup>2</sup> | $9.80665 \times 10^6$ | 9.80665                  | 1                        | $1 \times 10^2$          |
| kgf/cm <sup>2</sup> | $9.80665 \times 10^4$ | $9.80665 \times 10^{-2}$ | $1 \times 10^{-2}$       | 1                        |

| [Force]     | kW       | kgf · m/sec | HP      |
|-------------|----------|-------------|---------|
| kW          | 1        | 102.0       | 1.341   |
| kgf · m/sec | 0.009807 | 1           | 0.01315 |
| HP          | 0.7457   | 76.04       | 1       |