Appendix M
Cables Characteristics

Cable characteristics conform to the normative CEI 20–22 III and CEI 20–38.

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ST212 Coaxial Cable

Mechanical data		
Ref.	Description	Dimensions
[1]	Tinned copper center conductor	∅ 0.4mm
[2]	Polythene dielectric	∅ 1.9mm
[3]	Shield of combined aluminium polyester tape: . minimum thickness	 0.065mm
[4]	Screen composed of: . tinned copper braid	 0.10mm
[5]	Jacket (RAL7001): . maximum outer diameter . length	 ∅3,2mm 250± 10m

Technical characteristics	
Description	Rated values
– Maximum electrical resistance of inner conductor	145Ω/km
– Isolation resistance of inner conductor	>10,000 MΩ/km
– Nominal capacity (800 to 1000 Hz)	60pF/m
– Dielectric strength	2,000Vdc for 1 min
– Echo impedance at 1 MHz	76Ω ± 2Ω
– Maximum attenuation at 1 MHz	2dB/100m
– Maximum attenuation at 17 MHz	8dB/100m

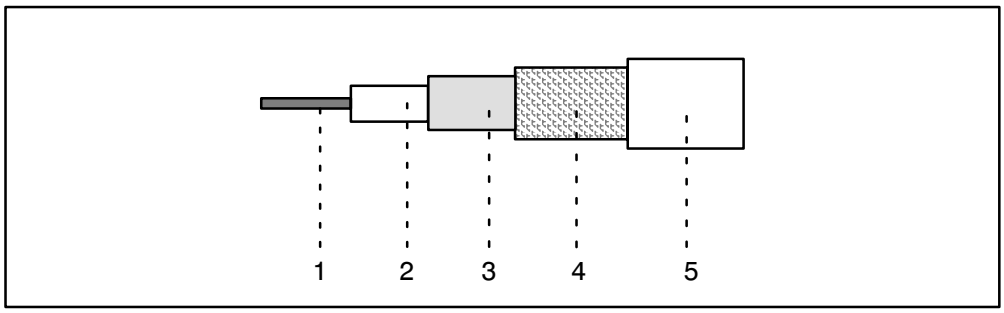

Fig. M–1 *Leading particulars*

ST214 Coaxial Cable

Mechanical data		
Ref.	Description	Dimensions
[1]	Tinned copper inner conductor	∅ 0.81mm
[2]	Polypropylene dielectric	∅ 3.70mm
[3]	Screen composed of: . tinned copper strip	0.10mm
[4]	Screen composed of: . mumetal strip – minimum thickness	0.05mm
[5]	Screen composed of: . tinned copper strip	0.10mm
[6]	Jacket (RAL7001): . maximum external diameter . length . tickness	∅ 5.9mm 250 ± 10m 0.5mm

Technical characteristics	
Description	Rated values
– Maximum electrical resistance of center conductor	37Ω/km
– Maximum isolation resistance of center conductor	>10 GΩ/km
– Nominal capacity	60pF/m
– Dielectric strength	2,000Vdc for 1 min
– Echo impedance at 1MHz	75Ω ± 1Ω
– Maximum attenuation at 1MHz	0.9dB/100m
– Maximum attenuation at 70MHz	8.5dB/100m

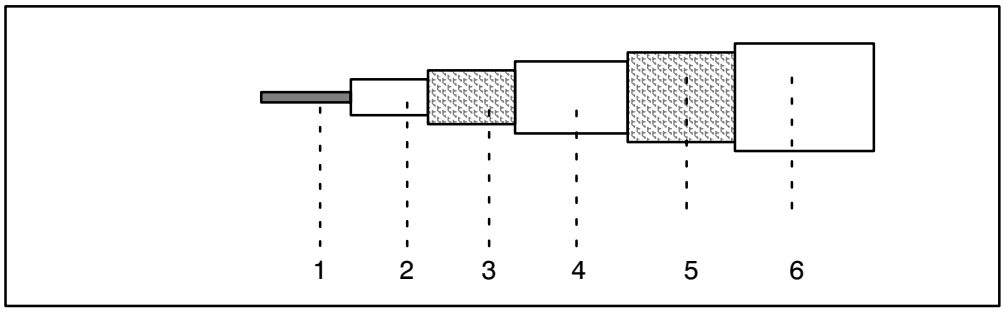

Fig. M–2 *Leading particulars*

RG58 C/U Coaxial Cable

Mechanical data		
Ref	**Description**	**Dimensions**
[1]	– Tinner Copper Center Conductor	0,19mm MAX
[2]	– Polythene dielectric	2,94 ± 0,1mm
[3]	– Tinner Copper Strip	0,13mm
[4]	– External jacket	4,96 ± 0,1mm

Technical characteristics	
Description	**Rated values**
– Voltage Test	5000V rms.
– Corona Effect	starting at 1900V rms
– Maximum Attenuation at 400MHz	45,9dB/100m
– Maximum Attenuation at 3000MHz	164dB/100m
– Impedence	50 ± 2Ohm

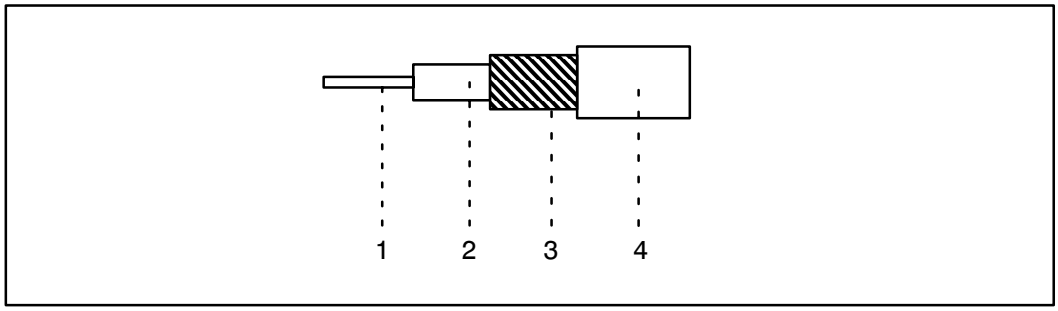

Fig. M–3 *Leading particulars*

Single Pair Cable, Single Screen

Mechanical data		
Ref.	Description	Dimensions
1	Tinned copper conductor	∅ 0.5mm
2	Polyethylene insulation of twisted pair (natural color for one wire and blue for the other)	∅ 1.8mm
3	Tinned copper continuity wire of shield	∅ 0.5mm
4	Shield of combined aluminium–polyester tape: . thickness Al . thickness polyester . width of tape	 0.05mm 0.02mm 16 ÷ 18mm
5	Synthetic tabe binding (if required)	
6	RAL 7001 rigid jacket: . maximum outer diameter	 ∅ 5mm

Technical characteristics	
Description	Rated values
– Maximum electrical resistance of individual conductor	97.8Ω/km
– Insulation resistance	>10,000 MΩ/km
– Nominal capacity	45pF/m
– Effective capacity to ground	500pF/m
– Test voltage	3,000Vdc
– Characteristic impedance in the 200 KHz to 2 MHz band (nominal values)	120÷130Ω
– Maximum attenuation at 1 MHz and at 20^{o} centigrade	19dB/km
– Near end crosstalk attenuation in the 60 KHz to 2 Mhz band between adjacent cables over a 50 m length	100dB

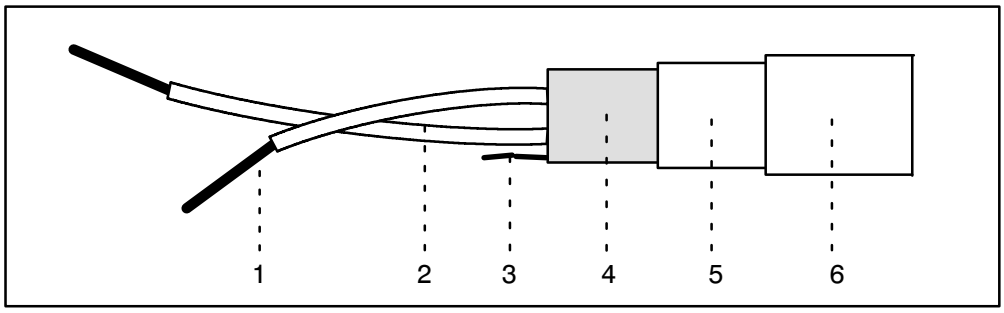

Fig. M–4 *Leading particulars*

4 Pair Cable, Single Screen

Mechanical data		
Ref.	Description	Dimensions
1	Tinned copper conductor	∅ 0.5mm
2	Insulation: . minimum thickness	 0.13mm
3	Synthetic tape binding	
4	Shield of combined aluminium–polyester tape . minimum thickness	 0.04mm
5	”Sheath–cutting” nylon wire	
6	External jacket: . maximum outer diameter . minimum thickness	 ∅ 6.5mm 0.6mm

Technical characteristics	
Description	Rated values
– Maximum electrical resistance of individual conductor	97.8Ω/km (20°C)
– Nominal capacity	≤120nF/km
– Maximum pair–to–pair capacity imbalance	≤400pF/500 m
– Insulation resistance	>500MΩ/km
– Rating Voltage	125Vac
– Test voltage – wire to wire	1.5kV
– wire to shield	1.5kV

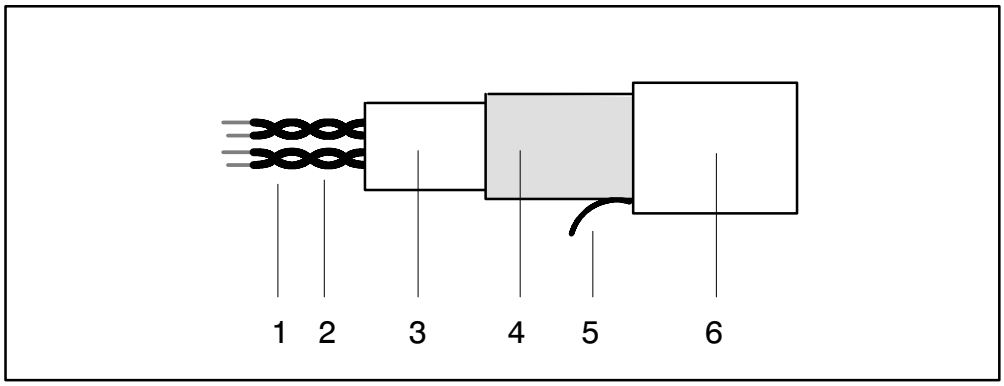

Fig. M–5 *Leading particulars*

8 Pair Cable, Double Screen

Mechanical data		
Ref.	Description	Dimensions
1	Tinned copper conductor	∅ 0.5mm
2	Insulation: . minimum thickness	 0.15mm
3	Synthetic tape binding	
4	Tinned copper continuity wire of shield	∅ 0.5mm
5a	Shield of combined aluminium polyester tape: . minimum thickness	 0.04mm
5b	Tinned copper braid: . diametre of single conductor . shielding . impedance	 ≥ 0,1mm > 70% ≤ 10mΩ/m
6	'Sheath–cutting' nylon wire	
7	External jacket: . maximum outer diameter . average thickness	 ∅ 9.0mm 0.7mm

Technical characteristics	
Description	Rated values
– Maximum electrical resistance of individual conductor	97.8Ω/km (20°C)
– Maximum capacity (800 to 1000 Hz)	≤120nF/km
– Maximum pair–to–pair capacity imbalance (800 to 1000 Hz)	≤500pF/500m
– Insulation resistance (500Vdc)	>10 GΩ/km
– Test voltage :	
wire to wire	1.5kV
wire to shield	1.5kV

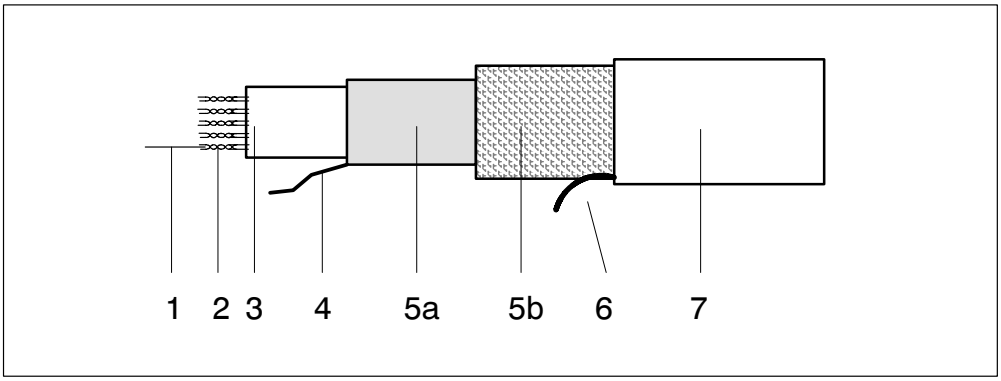

Fig. M–6 *Leading particulars*

8 Pair Cable, Single Screen

Mechanical data		
Ref.	Description	Dimensions
1	Tinned copper conductor	∅ 0.5mm
2	Insulation: . minimum thickness	 0.15mm
3	Synthetic tape binding	
4	Tinned copper continuity wire of shield	∅ 0.5mm
5	Shield of combined aluminium polyester tape: . minimum thickness	 0.05mm
6	Synthetic tape binding (if present)	
7	'Sheath–cutting' nylon wire	
8	External jacket: . maximum outer diameter . average thickness	 ∅ 8.0mm 0.7mm

Technical characteristics	
Description	Rated values
– Maximum electrical resistance of individual conductor	97.8Ω/km (20°C)
– Maximum capacity (800 to 1000Hz)	≤120nF/km
– Maximum pair–to–pair capacity imbalance (800 to 1000Hz)	≤500pF/500 m
– Insulation resistance (500Vdc)	>10 GΩ/km
– Test voltage :	
wire to wire	1.5kV
wire to shield	1.5kV

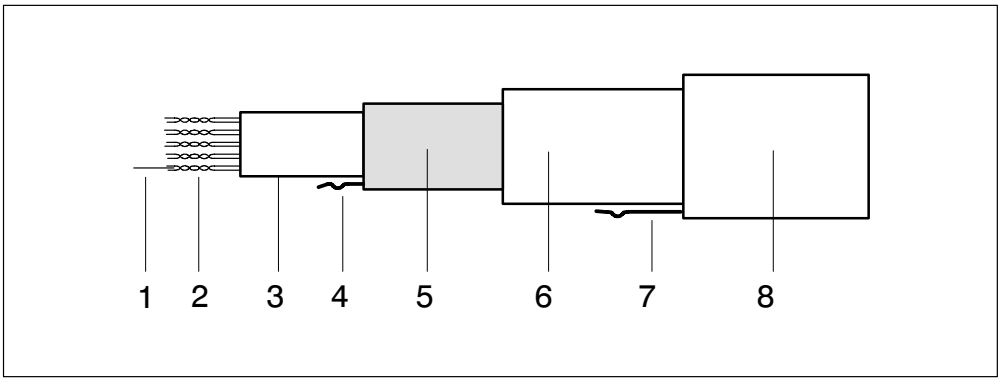

Fig. M–7 *Leading particulars*

8 Screened Pairs Cable, Double Screen

Mechanical data		
Ref.	Description	Dimensions
1	Tinner copper conductor	∅ 0.51mm
2	Polyetylene insulation	∅ 1.4mm
3	Tinned copper continuity wire of shield	∅ 0.51mm
4	Shield of combined aluminium polyester tape	
5	Internal jacket	
6	Tinned copper braid	≥0.1mm
7	External jacket maximum outer diameter	∅ 16.1mm

Technical characteristics	
Description	Rated values
– Test voltage	2kVcc – 1min
– Rating voltage	300Vac
– Maximum electrical resistance of individual conductor	< 98.7 Ω/km 20°C
– Insulation resistance	>10,000 MΩ/km
– Maximum capacity –conductor/conductor	60nF/km
–conductor/shield (f=800Hz)	<95nF/km
– Near end crosstalk attenuation in the 60kHz to 2MHz	>100dB
– Maximum attenuation at 1 MHz	≤20.2dB/km

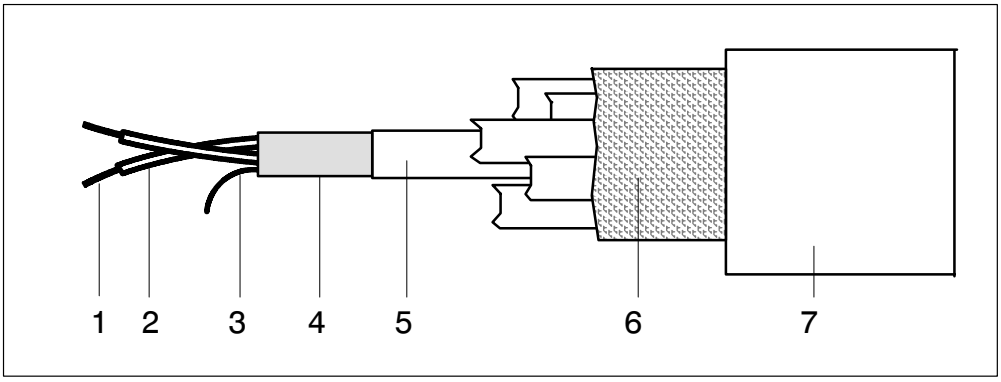

Fig. M–8 *Leading particulars*

12+1 Pair Cable, Double Screen

Mechanical data		
Ref.	Description	Dimensions
1	Tinned copper conductor	∅ 0.4mm
2	Insulation: . minimum thickness	 0.13mm
3	Synthetic tape binding	
4	Tinned copper continuity wire of shield	∅ 0.4mm
5a	Shield of combined aluminium polyester tape: . minimum thickness	 0.04mm
5b	Tinned copper braid shield: . diametre of single conductor . shielding . impedance	 ≥ 0,1mm > 70% ≤ 10mΩ/m
6	'Sheath–cutting' nylon wire	
7	External jacket: . maximum outer diameter . average thickness	 ∅ 7.5mm 0.4mm

Technical characteristics	
Description	Rated values
– Maximum electrical resistance of individual conductor	153Ω/km (20°C)
– Maximum capacity (800 to 1000 Hz)	≤120nF/km
– Maximum pair–to–pair capacity imbalance (800 to 1000 Hz)	≤400pF/500 m
– Insulation resistance (500Vdc)	>500 MΩ/km
– Test voltage :	
wire to wire	1.5kV
wire to shield	1.5kV

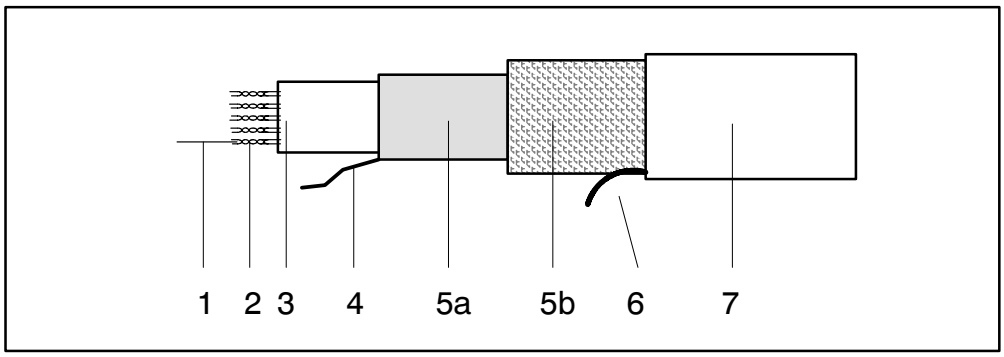

Fig. M–9 *Leading particulars*

12+1 Pair Cable, Single Screen

Mechanical data		
Ref.	Description	Dimensions
1	Tinned copper conductor	∅ 0.4mm
2	Insulation: . Minimum thickness	 0.13mm
3	Synthetic tabe binding (one or several tapes)	
4	Tinned copper continuity wire of shield	∅ 0.4mm
5	Shield of combined aluminium polyester tape: . thickness Al . thickness polyester	 0.015mm 0.012mm
6	Synthetic tabe binding (one or several layers) – If present	
7	”Sheath–cutting” nylon wire	
8	Grey jacket: . maximum outer diameter . thickness	 ∅ 6.5 mm 0,4±0,15mm

Technical characteristics	
Description	Rated values
– Maximum electrical resistance of individual conductor	153Ω/km (20°C)
– Maximum capacity (800 to 1000 Hz)	≤120nF/km
– Maximum pair–to–pair capacity imbalance (800 to 1000 Hz)	≤400pF/500 m
– Insulation resistance (500Vdc)	>500 MΩ/km
– Test voltage :	
wire to wire	1.5kV
wire to shield	1.5kV

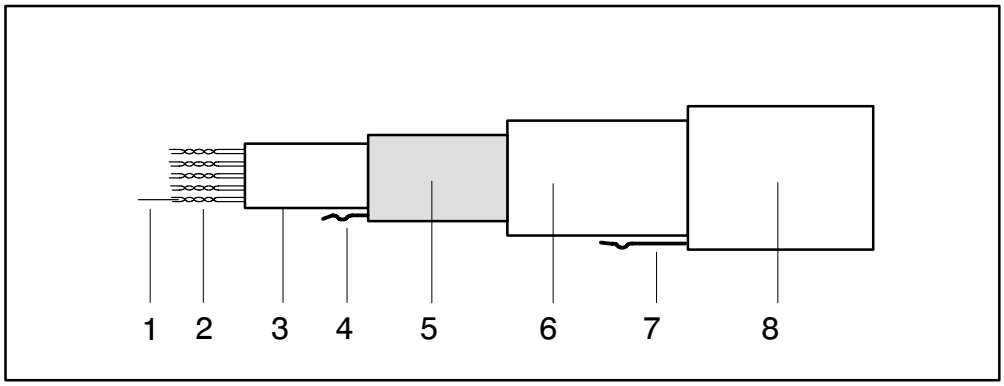

Fig. M–10 *Leading particulars*

17+1 Pair Cable, Double Screen

Mechanical data		
Ref.	Description	Dimensions
1	Tinned copper conductor	∅ 0.5mm
2	Insulation: . minimum thickness	 0.15mm
3	Synthetic tape binding	
4	Tinned copper continuity wire of shield	∅ 0.5mm
5a 5b	Electromagnetic shield: . combined aluminium–polyester tape, minimum thickness – Tinned copper braid: . diametre of single conductor . shielding . impedance	 0.04mm ≥0.1mm > 70% ≤ 10mΩ/m
6	”Sheath–cutting” nylon wire	
7	External jacket: . maximum outer diameter . minimum thickness	 ∅ 9.5mm 0.5mm

Technical characteristics	
Description	Rated values
– Maximum electrical resistance of individual conductor	< 97.8 Ω/km
– Nominal capacity	≤120nF/km
– Maximum pair–to–pair capacity imbalance	≤400pF/500m
– Insulation resistance	>500MΩ/km
– Rating Voltage	125Vac
– Test voltage – wire to wire	1.5kV
– wire to shield	1.5kV

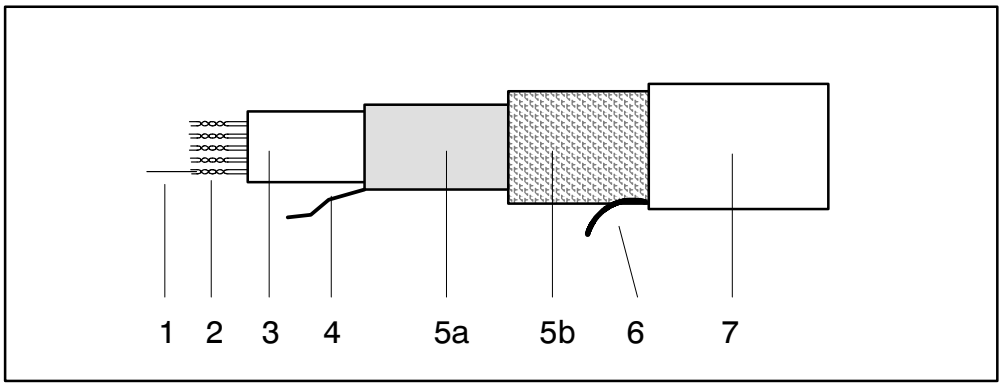

Fig. M–11 *Leading particulars*

17+1 Pair Cable, Single Screen

Mechanical data		
Ref.	Description	Dimensions
1	Tinned copper conductor	∅ 0.5 mm
2	Insulation: . minimum thickness	∅ 0.9 mm 0.15 mm
3	”Sheath–cutting” nylon wire	
4	Polyester tape	
5	Tinned copper continuity wire of shield	
6	Shield of combined aluminium–polyester tape	0.022mm (Al)
7	”Sheath–cutting” nylon wire	
6	Grey external jacket: . maximum outer diameter	 ∅ 8.5 mm

Technical characteristics	
Description	Rated values
– Test voltage	1kVac – 1.5kVdc
– Rating voltage	125Vac
– Maximum electrical resistance of individual conductor	< 97.8 Ω/km
– Insulation resistance	> 500MΩ/km
– Nominal capacity	125nF/km
– Maximum pair–to–pair capacity inbalance	400 pF

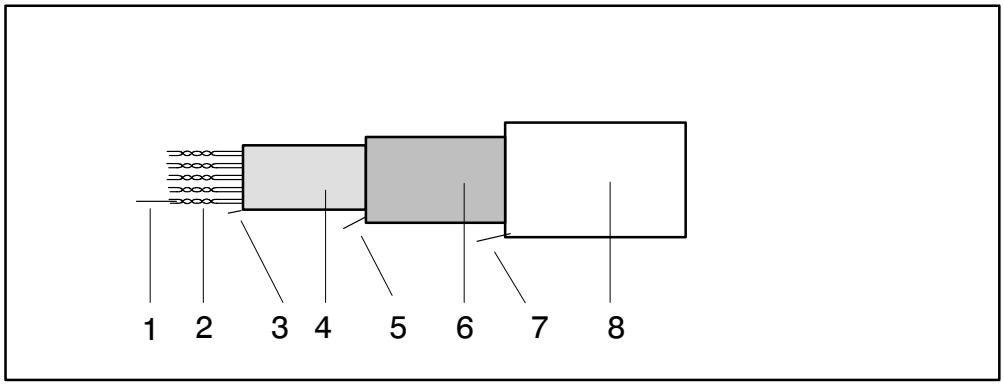

Fig. M–12 *Leading particulars*

30+1 Pair Cable, Double Screen

Mechanical data		
Ref.	Description	Dimensions
1	Tinned copper conductor	∅ 0.4mm
2	Insulation: . minimum thickness	 0.13mm
3	Synthetic tape binding	
4	Tinned copper continuity wire of shield	∅ 0.4mm
5a 5b	Shield of combined aluminium polyester tape: . minimum thickness Tinned copper braid shield . diametre of single conductor . shielding . impedance	 0.04mm ≥0.1mm > 70% ≤ 10mΩ/m
6	'Sheath–cutting' nylon wire	
7	External jacket: . maximum outer diameter . average thickness	 ∅ 10.5mm 0.4mm

Technical characteristics	
Description	Rated values
– Maximum electrical resistance of individual conductor	153Ω/km (20°C)
– Maximum capacity (800 to 1000 Hz)	≤120nF/km
– Maximum pair–to–pair capacity imbalance (800 to 1000 Hz)	≤400pF/500m
– Insulation resistance (500Vdc)	>500 MΩ/km
– Test voltage :	
wire to wire	1.5kV
wire to shield	1.5kV

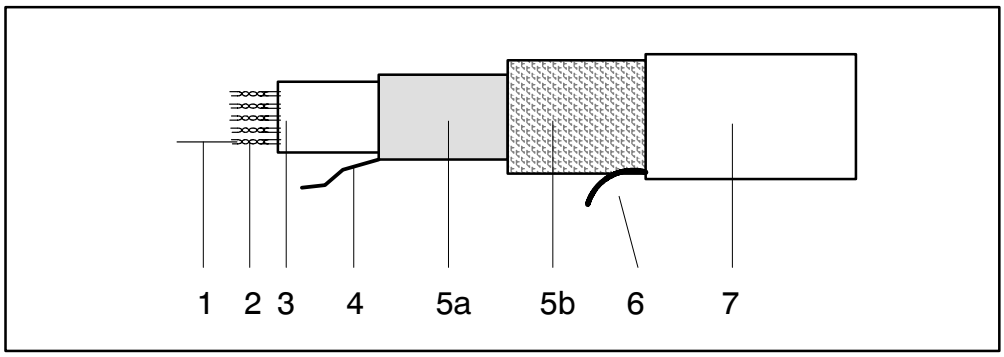

Fig. M–13 *Leading particulars*

30+1 Pair Cable, Single Screen

Mechanical data		
Ref.	Description	Dimensions
1	Tinned copper conductor	∅ 0.4 mm
2	Insulation: . Minimum thickness	 0.15 mm
3	Synthetic tabe binding (one or several tapes)	
4	Tinned copper continuity wire of shield	∅ 0.4 mm
5	Shield of combined aluminium polyester tape: . thickness Al . thickness polyester	 0.015 mm 0.012 mm
6	Synthetic tabe binding (one or several layers)	
7	”Sheath–cutting” nylon wire	
8	Grey jacket: – maximum external diameter – thickness	 ∅11mm 0.5mm

Technical characteristics	
Description	Rated values
– Maximum electrical resistance of individual conductor	153Ω/km (20°C)
– Maximum capacity	120nF/km
– Maximum pair–to–pair capacity imbalance	300pF/500 m
– Insulation resistance	500MΩ/km
– Test voltage	1kVac–1.5Vdc

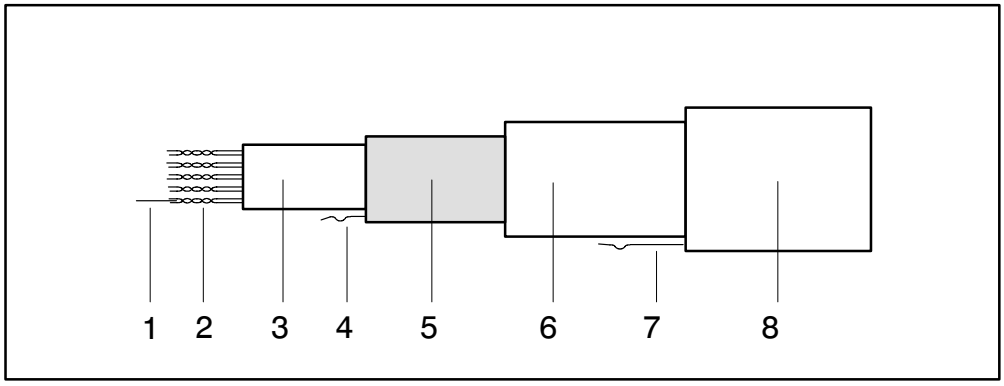

Fig. M–14 *Leading particulars*

Power Supply Cable 2x1.5mm^2

Mechanical Characteristics		
Ref	**Description**	**Dimensions**
1	– Copper inner conductors – Nominal section	1.5 mm^2
2	– Fire–proof, G10 quality, insulator * Diameter measured on the insulator	∅ 3.6 mm
3	– Filler in non–fibrous and non–hygroscopic materials	
4	– LSZH external jacket : maximum external diameter	∅ 11.20 mm

Technical Characteristics	
Description	**Dimensions**
– Temperature range	0^{o}C / +90^{o}C
– Test Voltage	4kV ac
– Maximum electrical resistance of individual conductor	13.70 Ω/km (20^{o}C)

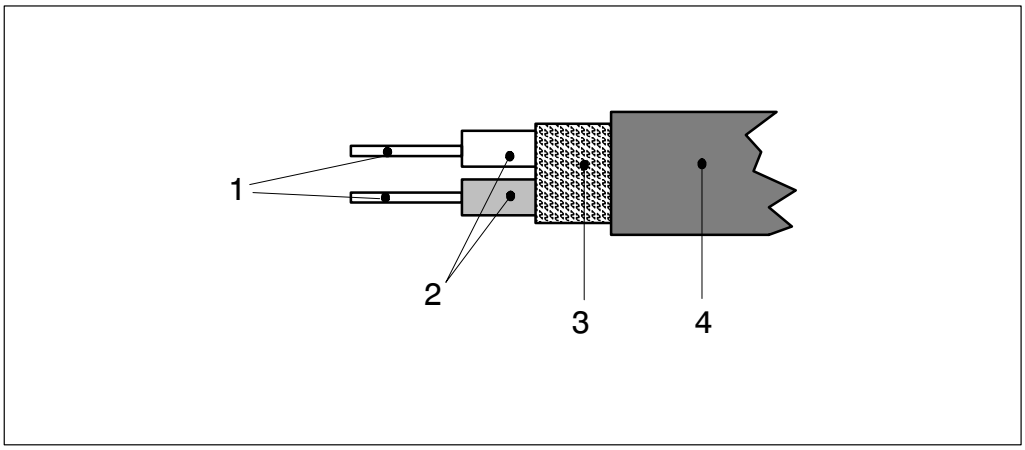

Fig. M–15 *Leading particulars*

Power Supply Cable 2x2.5mm^2

Mechanical Characteristics		
Ref	**Description**	**Dimensions**
1	– Copper inner conductors – Nominal section	2.5 mm^2
2	– Fire–proof, G10 quality, insulator * Diameter measured on the insulator	∅ 4.0 mm
3	– Filler in non–fibrous and non–hygroscopic materials	
4	– LSZH external jacket : maximum external diameter	∅ 12.10 mm

Technical Characteristics	
Description	**Dimensions**
– Temperature range	0^{o}C / +90^{o}C
– Test Voltage	4kV ac
– Maximum electrical resistance of individual conductor	8.21 Ω/km (20^{o}C)

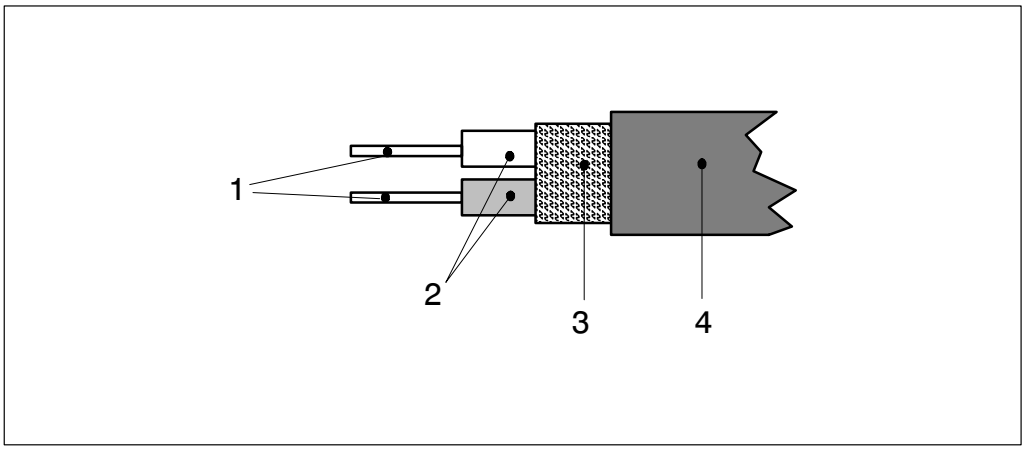

Fig. M–16 *Leading particulars*

Screened Power Supply Cable 2x1.5mm^2

Mechanical Characteristics		
Ref	**Description**	**Dimensions**
1	– Copper inner conductors – Nominal section	1.5 mm^2
2	– Fire–proof, G10 quality, insulator * Diameter measured on the insulator	∅ 3.0 mm
3	– Tinned copper braid shield – Covering factor	≥85%
4	– 'Sheath–cutting' nylon wire	
5	– LSZH external jacket : maximum external diameter	∅ 8.0 mm

Technical Characteristics	
Description	**Dimensions**
– Temperature range	–40^{o}C / +80^{o}C
– Test Voltage	3kV ac
– Maximum electrical resistance of individual conductor	13.70 Ω/km (20^{o}C)

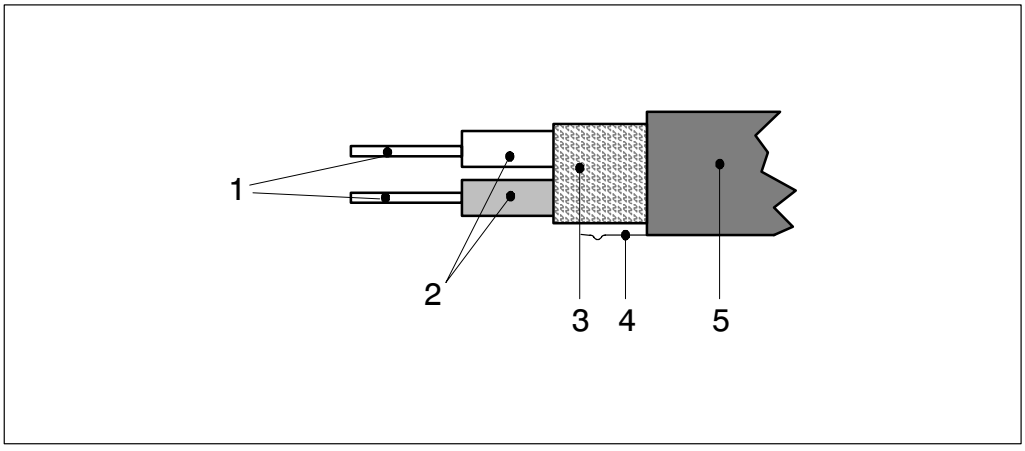

Fig. M–17 *Leading particulars*

Screened Power Supply Cable 2x2.5mm^2

Mechanical Characteristics		
Ref	**Description**	**Dimensions**
1	– Copper inner conductors – Nominal section	2.5 mm^2
2	– Fire–proof, G10 quality, insulator * Diameter measured on the insulator	∅ 4.0 mm
3	– Tinned copper braid shield – Covering factor	≥85%
4	– 'Sheath–cutting' nylon wire	
5	– LSZH external jacket : maximum external diameter	∅ 9.5 mm

Technical Characteristics	
Description	**Dimensions**
– Temperature range	–40^{o}C / +80^{o}C
– Test Voltage	3kV ac
– Maximum electrical resistance of individual conductor	13.70 Ω/km (20^{o}C)

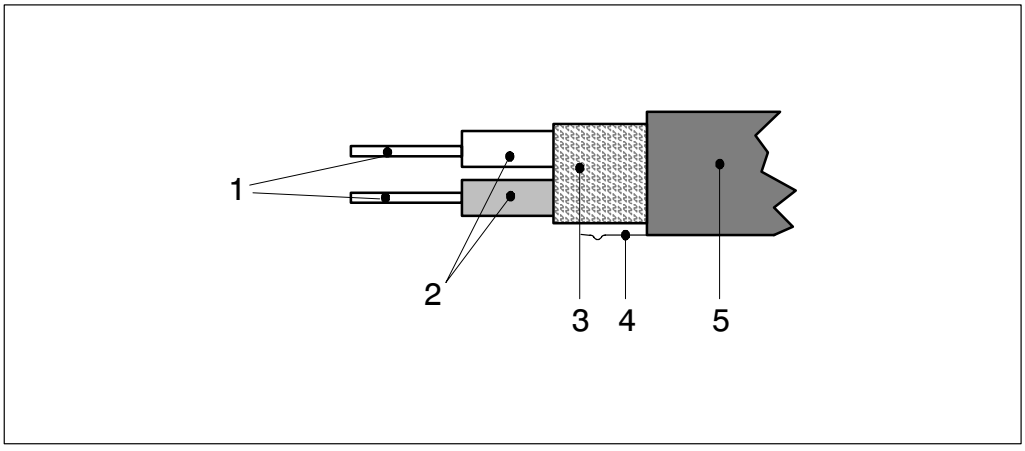

Fig. M–18 *Leading particulars*

Earthing Cable

16 mm² section

Mechanical data		
Ref.	Description	Dimensions
1	Red copper conductor	∅ 5.7mm
2	Insulation thickness	1.0mm
3	Maximum diameter	∅ 8.8mm
4	Nominal cross–section	16mm²

Technical characteristics	
Description	Rated values
– Conductor resistance (20° C d.c.)	1.21Ohm/Km
– Conductor resistance (70° C d.c.)	1.45Ohm/Km
– Minimum insulation resistance (20° C)	65MOhm/Km

25 mm² section

Mechanical data		
Ref.	Description	Dimensions
1	Red copper conductor	∅ 6.9mm
2	Insulation thickness	1.2mm
3	Maximum diameter	∅ 11.0mm
4	Nominal cross–section	25mm²

Technical characteristics	
Description	Rated values
– Conductor resistance (20° C d.c.)	0.78Ohm/Km
– Conductor resistance (70° C d.c.)	0.93Ohm/Km
– Minimum insulation resistance (20° C)	60MOhm/Km

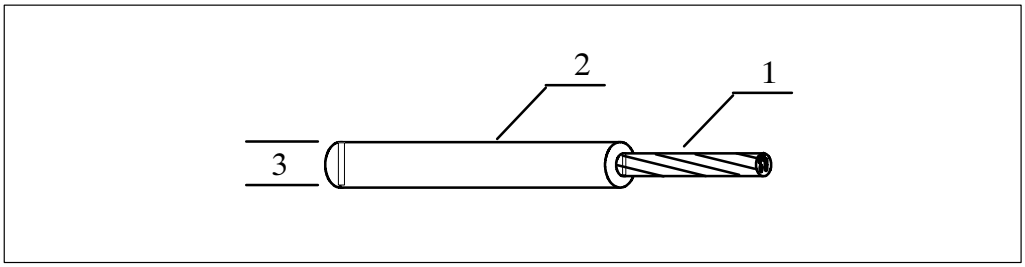

Fig. M–19 *Leading particulars*

Single Pole Cable For Service Voltage

Mechanical data		
Ref.	Description	Dimensions
1	Red copper conductor	∅ 1.6mm
2	Insulation	0.7mm
3	Maximum diameter	∅ 3.5mm
4	Nominal Cross–section	1.5mm^2

Technical characteristics	
Description	Rated values
– Conductor resistance (20^o C d.c.)	13.3Ohm/Km
– Conductor resistance (70^o C d.c.)	15.9Ohm/Km
– Minimum insulation resistance (20^o C)	170MOhm/Km

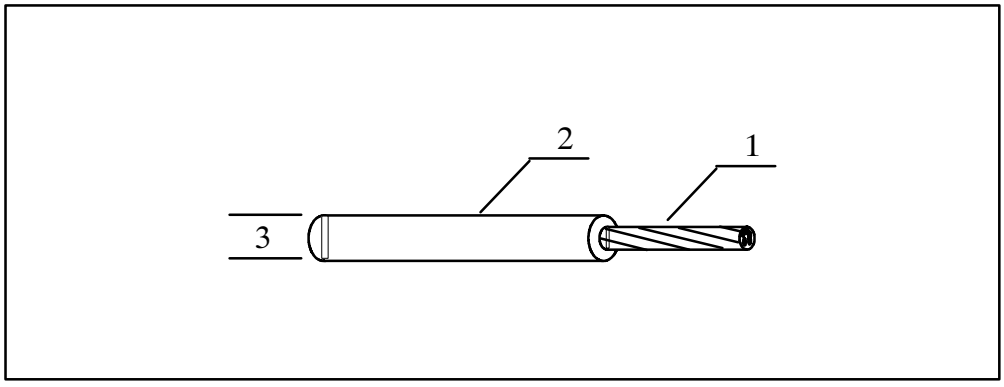

Fig. M–20 *Leading particulars*