

2. FERRITE COATED HOOK-UP WIRES - LiMY

Ferrite coated stranded conductors are the basic components of our low pass cables. These conductors are separately used as hook-up wires.

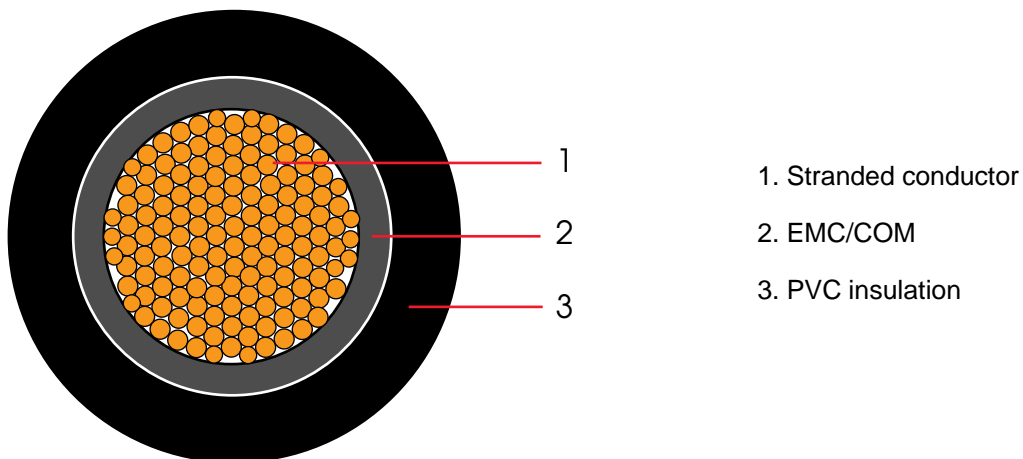
TYPICAL USE : * for cabling electronic devices and control cabinets in environments with significant electromagnetic interference

TYPES : * Standard : 0,5 mm² / 0,75 mm² / 1,0 mm² / 1,5 mm² / 2,5 mm²

Colour : black

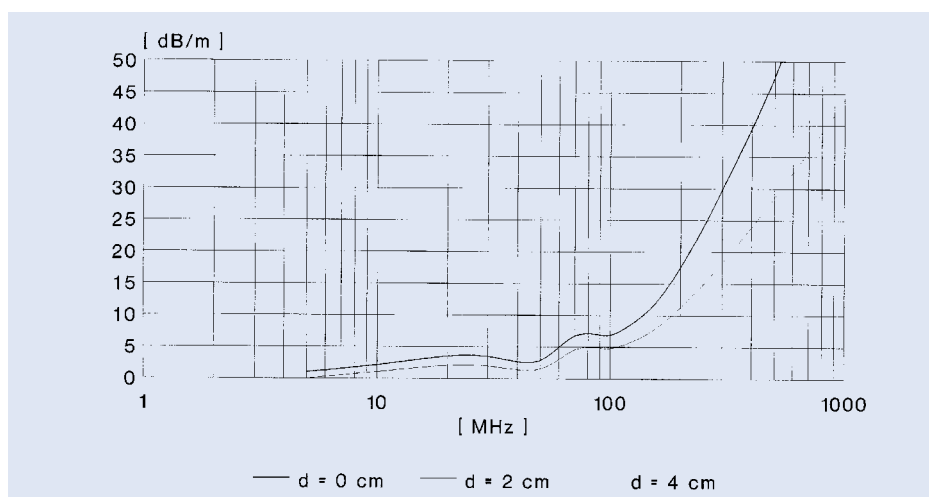
* Upon request : - other sections up to 6,0 mm²
- other colours

CONSTRUCTION :



CHARACTERISTICS :

Typical attenuation
versus frequency and
distance to earth -
all types



LiMY	Weight (kg/km)	Outer diameter (mm)	R' (Ω/km)	Part number
0,50 mm ²	17	2,9	40,10	2473
0,75 mm ²	21	3,1	26,70	2477
1,00 mm ²	24	3,3	20,00	2569
1,50 mm ²	32	3,7	13,70	2570
2,50 mm ²	47	4,4	8,21	2571

Technical data for standard LiMY-types

3. LOW PASS MAINS CABLES - GNLM

These HF absorptive cables have individually ferrite (EMC/COM) coated conductors and a screen made of aluminium foil.

These cables are very useful in applications where mains disturbances are a problem. In combination with a mains filter the attenuation results are excellent. They perform especially well for steep impulses, e.g. burst impulses.

GNLM-types have VDE, UL and CSA approvals.

TYPICAL USE :

- * mains connection of data processing equipment
- * electronic cash machines in supermarkets
- * mains connections in places where thermostats (e.g. deep freezers) or neon-light can generate disturbances

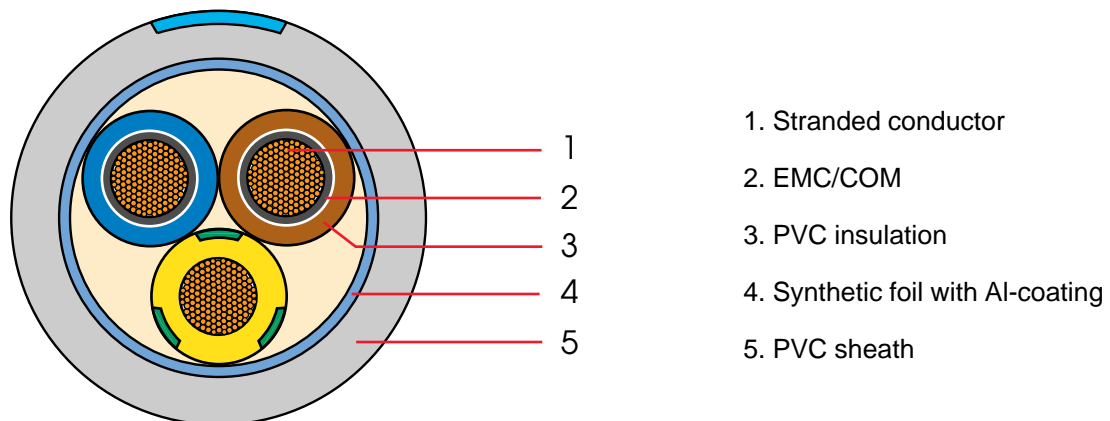
TYPES :

- * Standard : 3G0,75
3G1,00
3G1,50
3G2,50
3G4,00

Colour : outer sheath grey RAL 7035 with blue striping

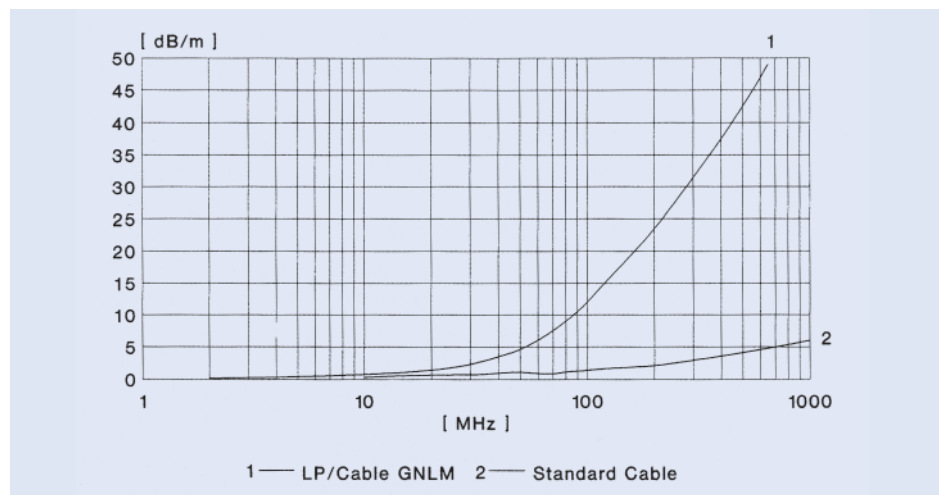
* Upon request : - NLM-cables (GNLM-types without static screen)

CONSTRUCTION :



CHARACTERISTICS :

Typical attenuation
versus frequency -
all types



GNLM	Weight (kg/km)	Outer diameter (mm)	R' (Ω/km)	Part number
3G0,75	95	8,4	26,70	4074
3G1,00	108	8,5	20,00	2154
3G1,50	141	9,9	13,70	2155
3G2,50	204	11,8	8,21	2596
3G4,00	270	13,1	5,09	0092

Technical data for standard GNLM-types

4. LOW PASS INSTRUMENTATION CABLES - LiMYCY

In many industrial environments, electromagnetic disturbances are bitter reality. If you want to avoid these disturbances falsifying your measurements, low pass instrumentation cables from KABELWERK EUPEN are an elegant solution.

These screened, HF absorptive cables perform very well and give excellent protection against external disturbances in analogue signal circuits that are operated at low frequencies.

The conductors are individually coated with our famous ferrite compound (EMC/COM).

TYPICAL USE :

- * for linking sensors (force, pressure, temperature...) to PLC or amplifier
- * electronic balances
- * ABS-systems for motor vehicles

TYPES :

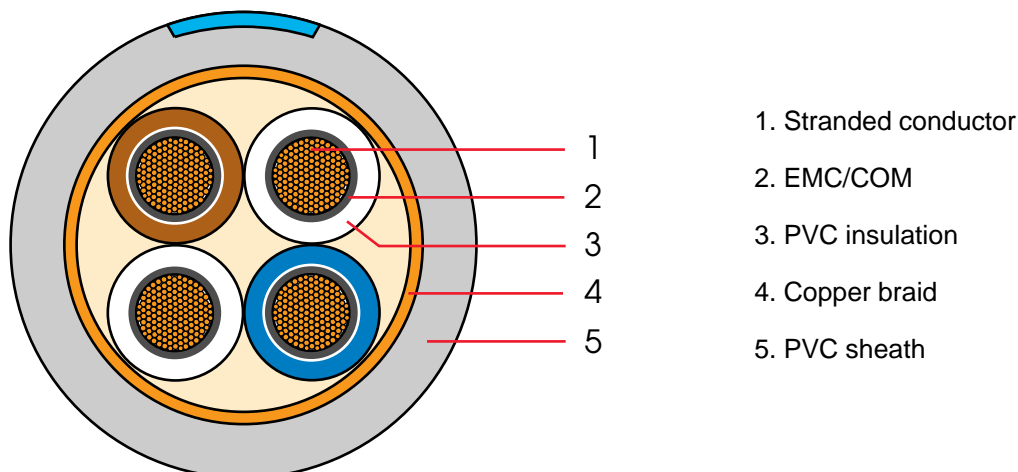
- * Standard : 2 x 0,25 mm²
- 4 x 0,25 mm²
- 2 x 0,50 mm²
- 4 x 0,50 mm²
- 4 x 0,75 mm²

Colour : - conductors according to DIN
 - outer sheath grey RAL 7035 with blue striping

* Upon request :

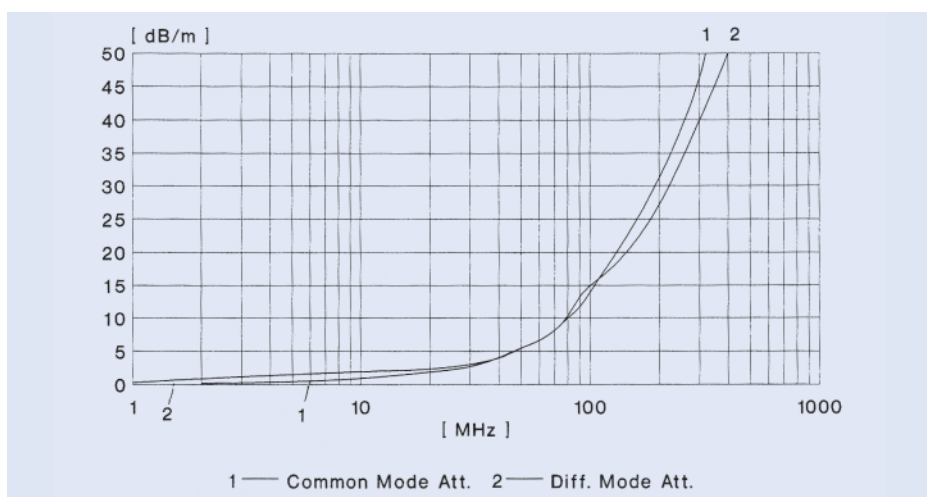
- other combinations from 1 x 0,25 mm² up to 24 x 0,75 mm² and other colours
- LiYMCY types : EMC/COM coating common for all conductors, under the screen

CONSTRUCTION :

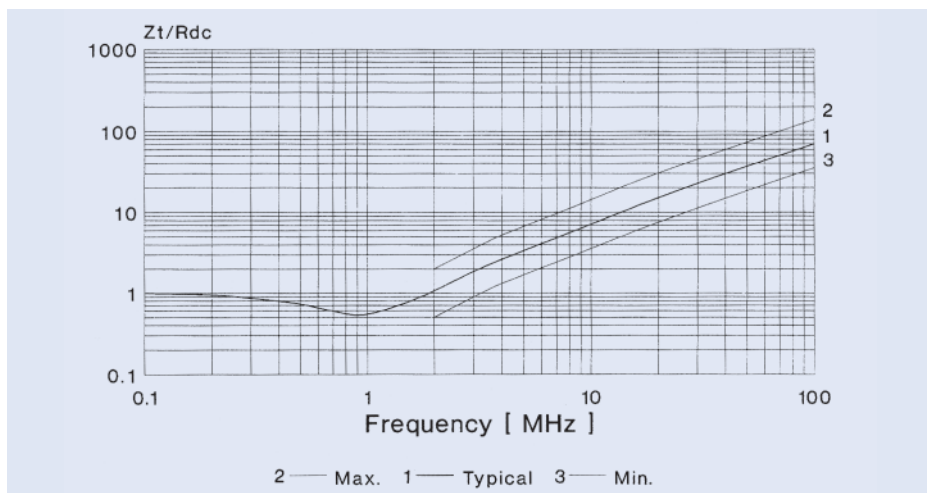


CHARACTERISTICS :

Typical attenuation of both common and differential mode disturbances versus frequency - all types



Transfer impedance Z_T related to screen resistance R_{DC} versus frequency - all types



LIMYCY	Weight (kg/km)	Outer diameter (mm)	R' (Ω/km)	R _{DC} (screen) (mΩ/m)	Part number
2 x 0,25 mm ²	61	7,1	75,0	8,0	3035
4 x 0,25 mm ²	96	8,7	75,0	9,0	3990
2 x 0,50 mm ²	93	8,2	40,1	8,5	4827
4 x 0,50 mm ²	129	9,3	40,1	9,0	1493
4 x 0,75 mm ²	147	9,8	26,7	10,0	6570

Technical data for standard low pass measurement cables

LiMY(St)CY-JZ

5. MOTOR CONNECTION CABLES FOR FREQUENCY CONVERTERS - LiMY(St)CY-JZ

Frequency converters for speed control of asynchronous motors are a well-known but unavoidable source of conducted and radiated interferences, due to the short pulse rise time of the converter. The often substantial distance between motor and frequency converter does nothing but emphasize common mode interferences.

As the converter's basic working principle cannot be modified, interference suppression of the system will only be possible through external means.

A very effective solution to this problem is given by our 3 or 4 conductor, double screened and ferrite coated motor drive cables.

Covering each individual conductor with a ferrite layer (EMC/COM) guarantees a considerable suppression of differential mode interference currents and dramatically reduces interference emission.

The cable is fitted with double screening : the first screen - a metal tape - reduces the capacitive coupling and the second one - a copper braid - has a high current carrying capacity.

The combination of both screens gives a low transfer impedance.

Through absorption in the conductor's ferrite coating, the voltage peaks in the motor windings will also be attenuated and the pulse rise time will be very seriously reduced.

This leads to a longer life time for the motor.

TYPICAL USE : * connection between asynchronous motor and frequency converter, for converters up to 45 kW (3 x 400 V / 65 A), at temperatures between -10°C and +70°C

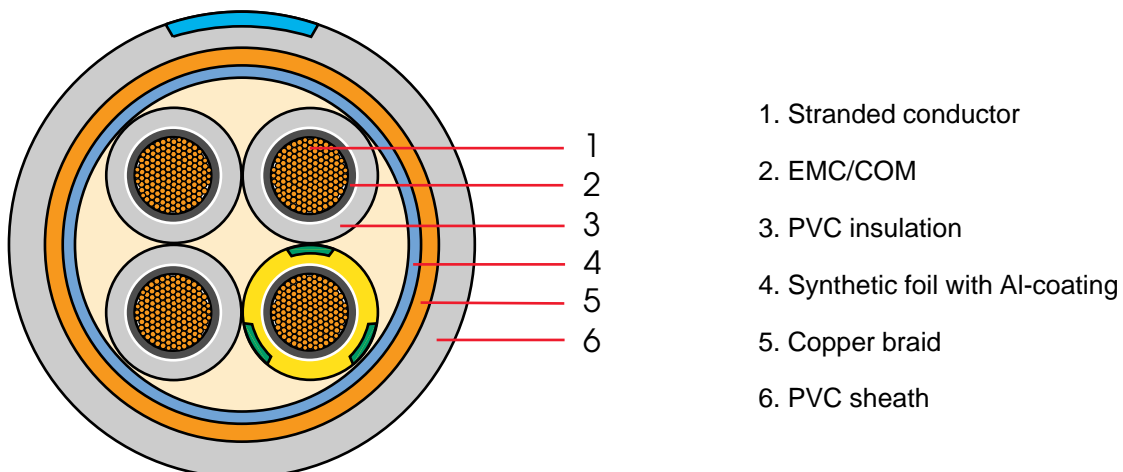
TYPES : * Standard :

3 x 1,5 mm ²	4G1,5 mm ²
3 x 2,5 mm ²	4G2,5 mm ²
3 x 4,0 mm ²	4G4,0 mm ²
3 x 6,0 mm ²	4G6,0 mm ²
3 x 10,0 mm ²	

Colour : - conductors grey, numbered
- outer sheath grey RAL 7035 with blue striping

* Upon request : - large section motor drive cables with double screening, but without EMC/COM, for connecting high power frequency converters (FRECO-EMC).

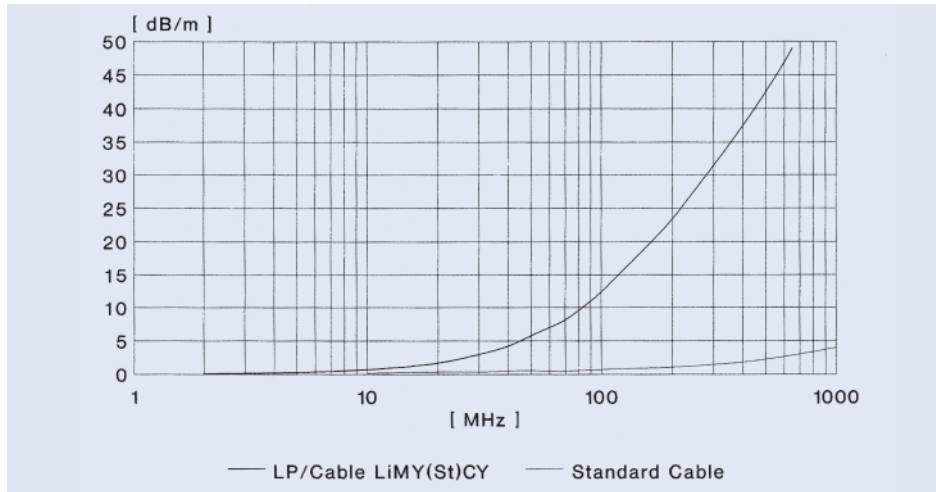
CONSTRUCTION :



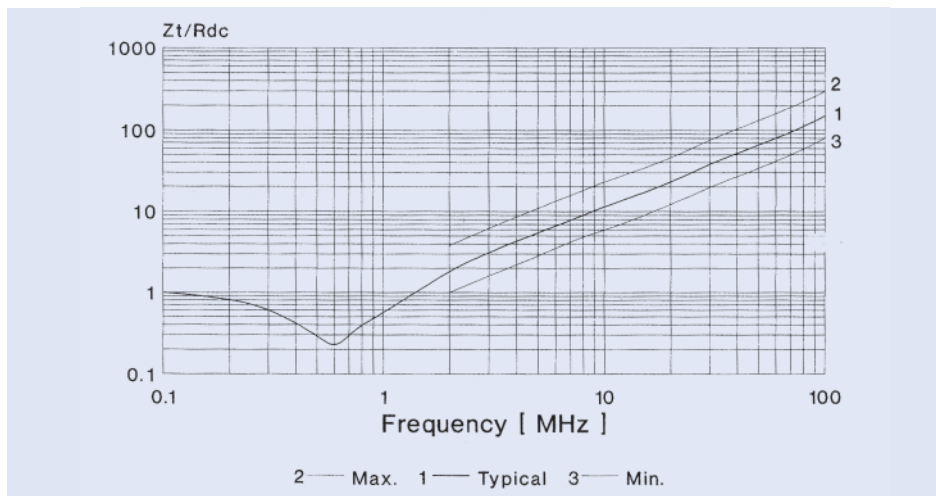
1. Stranded conductor
2. EMC/COM
3. PVC insulation
4. Synthetic foil with Al-coating
5. Copper braid
6. PVC sheath

CHARACTERISTICS :

Typical attenuation
versus frequency -
type 4 x 2,5 mm²



Transfer impedance Z_T
related to screen
resistance R_{DC} versus
frequency - all types



LiMY(St)CY-JZ	Weight (kg/km)	Outer diameter (mm)	C' (μF/km)	L' (mH/km)	R' (Ω/km)	R _{DC} (screen) (mΩ/m)	Part number
3 x 1,5 mm ²	174	10,6	0,16	2,5	13,70	4,82	2718
3 x 2,5 mm ²	275	12,9	0,17	2,7	8,21	2,60	7278
3 x 4,0 mm ²	350	14,2	0,18	2,8	5,09	2,27	7279
3 x 6,0 mm ²	445	15,9	0,19	3,0	3,39	2,00	7280
3 x 10,0 mm ²	666	19,4	0,20	3,1	1,95	1,85	7281
4G1,5 mm ²	219	11,8	0,16	2,5	13,70	5,00	8845
4G2,5 mm ²	334	14,4	0,17	2,7	8,21	3,00	8846
4G4,0 mm ²	421	15,6	0,18	2,8	5,09	2,50	8847
4G6,0 mm ²	550	18,2	0,19	3,0	3,39	1,70	0282

Technical data for standard motor drive cables

6. COMMON MODE SUPPRESSION CABLES - CMS

The efficiency of a cable screen against electromagnetic disturbances is based on two distinct effects. The electric field component is mainly reflected, whereas the magnetic component will be attenuated through eddy current losses in the cable screen.

By applying a layer of ferrite-filled elastomeres (EMC/COM) onto the screen of a screened cable, it is possible to obtain a considerable attenuation of the currents that circulate on the outer side of the screen.

The effect is comparable to the application of ferrite beads along the cable, but the homogeneous coating of **KABELWERK EUPEN's** CMS cables does not cause any steep changes in the impedance, thus avoiding reflections.

CMS cables are very useful in any circumstances where common mode disturbances or surface currents are creating problems.

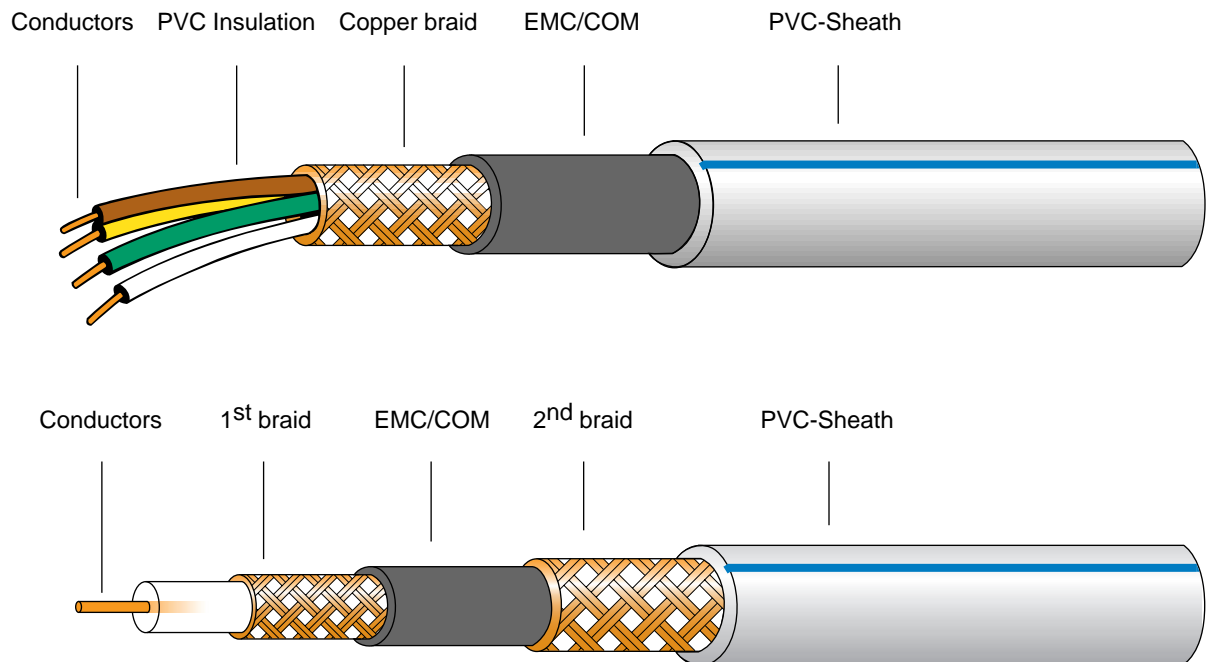
A further development are the so-called "Low Transfer Impedance" cables or LTI cables.

These are superscreened CMS cables where the ferrite compound layer itself is wrapped in a second metallic screen. Thus, the ferrite layer (EMC/COM) is sandwiched between two metal screens ; this largely enhances the total performance of the screen.

The transfer impedance of these cables is very low, which means that coupling of interferences from the environment to the cable's inner conductors is very unlikely. The result is an almost perfectly immune cable.

KABELWERK EUPEN manufactures two categories of CMS and LTI cables :

- 1.) stranded conductor CMS and LTI cables
- 2.) coaxial CMS and LTI cables



Typical construction of a CMS cable (up) and a LTI cable (below)

CMS/LiY(St)CMY

6.1 STRANDED CONDUCTOR CMS CABLES - CMS/LiY(St)CMY

TYPICAL USE :

- * connection between digital sensors and PLC or electronic circuitry
- * network connections in electromagnetically disturbed environments

TYPES :

- * **CMS/LiY(St)CMY** - PVC insulated conductors covered with a screen of polymer-backed aluminium foil and a copper braid, ferrite coated - characteristic impedance $70 \pm 10 \Omega$:

Standard :

- 2 x 0,14 mm²
- 2 x 0,25 mm²
- 2 x 0,50 mm²
- 2 x 2 x 0,50 mm²
- 4 x 2 x 0,50 mm²

Colour : - conductors coloured according to DIN 47100
- outer sheath grey RAL 7035 with blue striping

- * **CMS/LiYCMY** - PVC insulated conductors covered with a screen of a copper braid and ferrite coated.

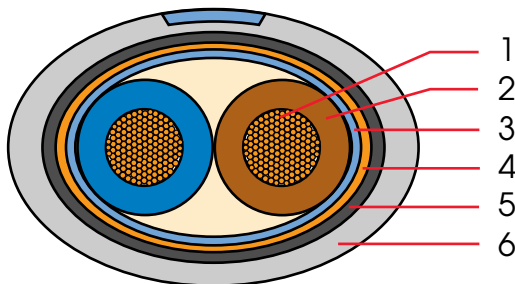
Standard :

- 4 x 0,14 mm²
- 7 x 0,14 mm²
- 2 x 2 x 0,25 mm²
- 4 x 2 x 0,25 mm²

Colour : - conductors coloured according to DIN 47100
- outer sheath grey RAL 7035 with blue striping

- * Upon request : - LTI cables ("Low Transfer Impedance") : CMS cables with double metallic screen and a layer of absorbing ferrite compound (EMC/COM) between both screens
- any screened cable with diameter up to 12 mm can be supplied as a CMS or a LTI cable
- PimF cables (pairs individually screened with metal foil)

CONSTRUCTION :

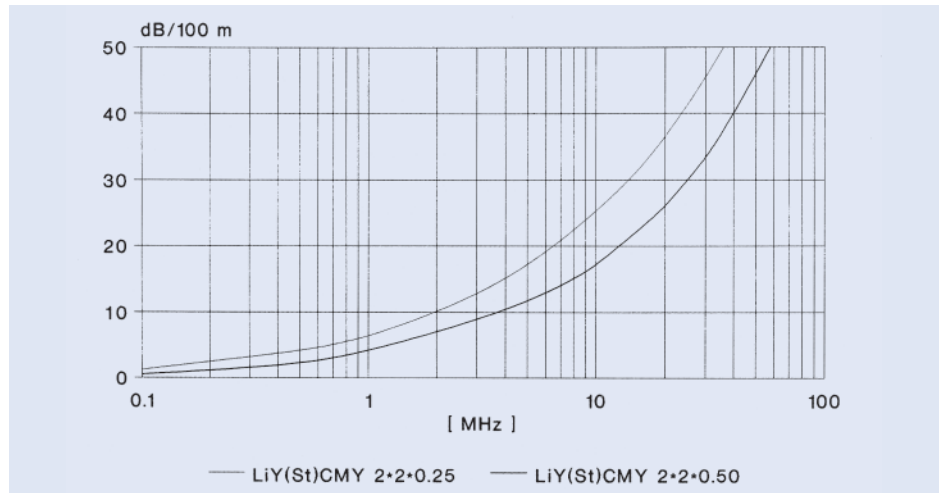


1. Stranded conductor
2. PVC insulation
3. Synthetic foil with Al-coating
4. Copper braid
5. EMC/COM
6. PVC sheath

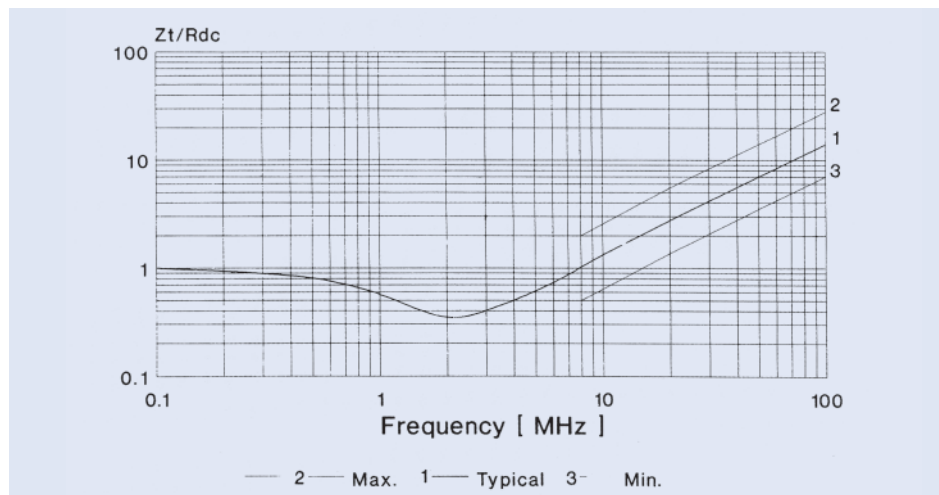
CMS/LiY(St)CMY

CHARACTERISTICS :

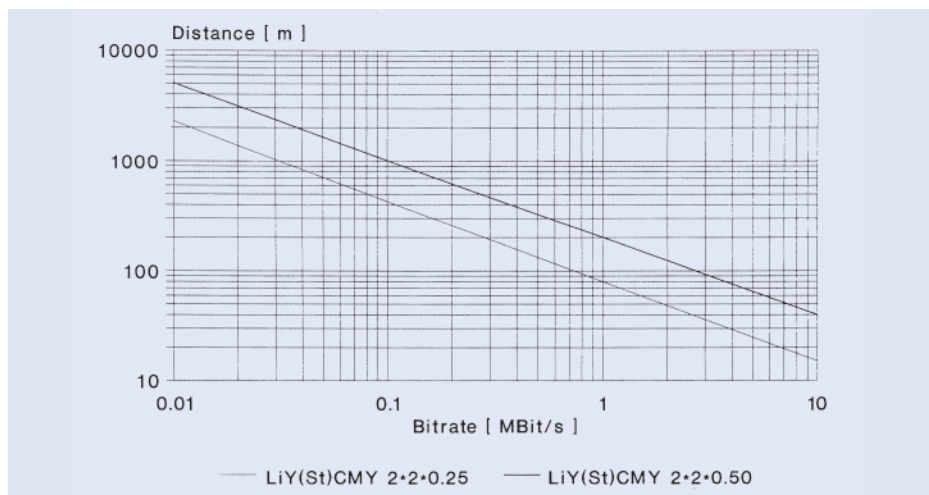
Typical signal attenuation
versus frequency -
PVC insulated versions



Transfer impedance Z_T
related to screen
resistance R_{DC} versus
frequency - all types



Number of megabits
per second transmittable
versus cable length -
PVC insulated versions



CMS/LiY(St)CMY	Weight (kg/km)	Outer diam. (mm)	C' (pF/m)	L' (μH/m)	R' (Ω/km)	R _{DC} (screen) (mΩ/m)	Part number
2 x 0,14 mm ²	55	5,6	80	0,5	138,0	21,0	0305
2 x 0,25 mm ²	63	6,0	90	0,6	75,0	18,0	4970
2 x 0,50 mm ²	105	7,5	130	0,7	40,1	9,0	0355
2 x 2 x 0,50 mm ²	200	11,3	130	0,7	40,1	7,0	3303
4x 2 x 0,50 mm ²	251	12,2	130	0,7	40,1	5,0	0668

CMS/LiYCMY	Weight (kg/km)	Outer diam. (mm)	C' (pF/m)	L' (μH/m)	R' (Ω/km)	R _{DC} (screen) (mΩ/m)	Part number
4 x 0,14 mm ²	62	6,5	80	0,5	138,0	25,0	5958
7 x 0,14 mm ²	73	6,5	80	0,5	138,0	22,0	3507
2 x 2 x 0,50 mm ²	135	9,1	90	0,6	75,0	13,0	0372
4 x 2 x 0,50 mm ²	156	9,7	90	0,6	75,0	11,0	0835

Technical data for standard multiconductor CMS cables

CMS/RG

6.2 COAXIAL CMS CABLES - CMS/RG

TYPICAL USE :

- * connection between antennas and measuring equipment
- * transmission of video signals in places that are subject to electromagnetic radiation

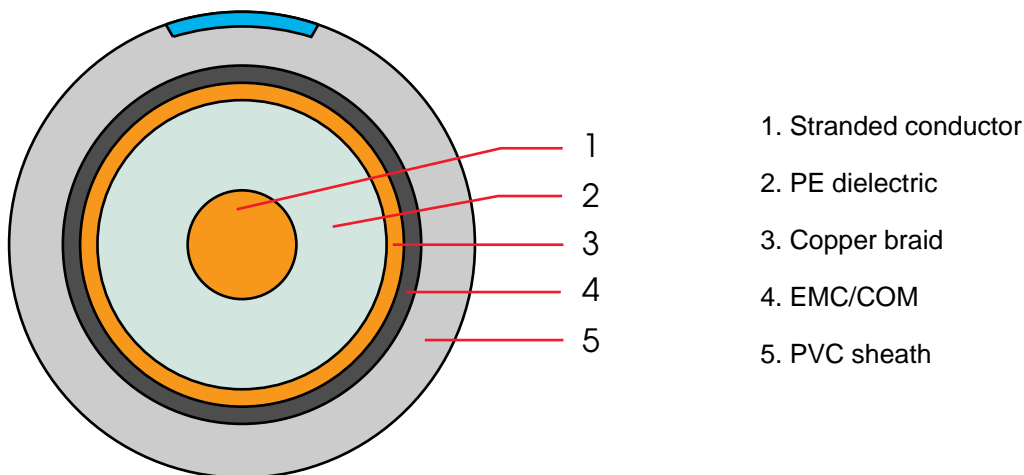
TYPES :

- * Standard : CMS/RG 58 - 50 Ω
CMS/RG 214 - 50 Ω

Colour : outer sheath grey RAL 7035 with blue striping

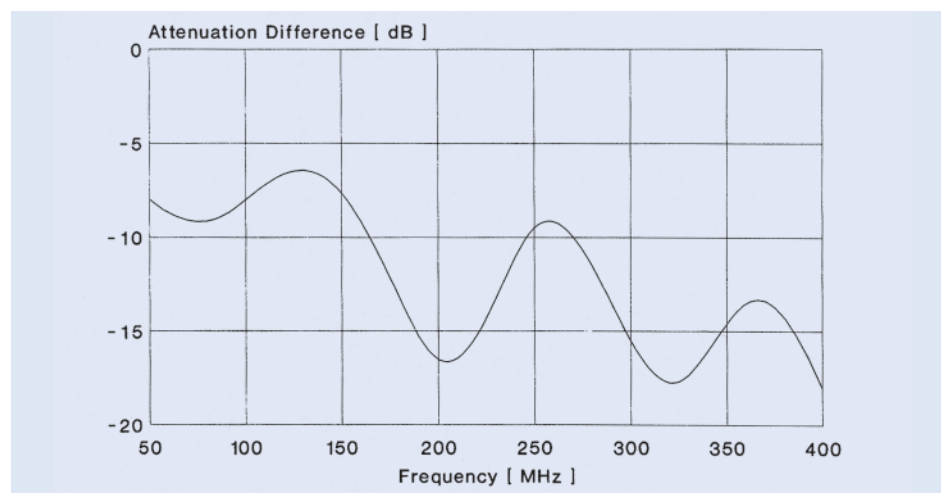
- * Upon request : - LTI cables ("Low Transfer Impedance") : CMS cables with double metallic screen and a layer of absorbing ferrite compound (EMC/COM) between both screens
- all KABELWERK EUPEN coaxial cables with diameter up to 12 mm can be supplied as CMS or LTI cables. Please ask for our "RF Cables" catalogue.

CONSTRUCTION :

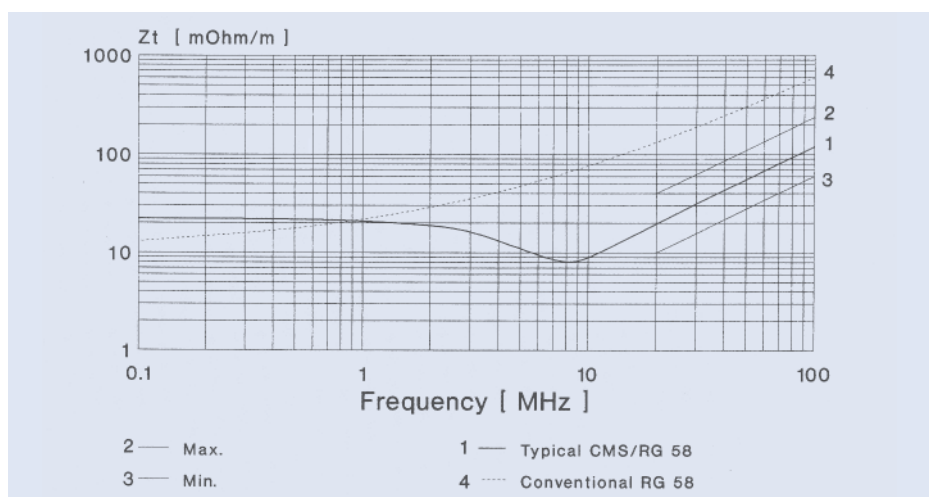


CHARACTERISTICS :

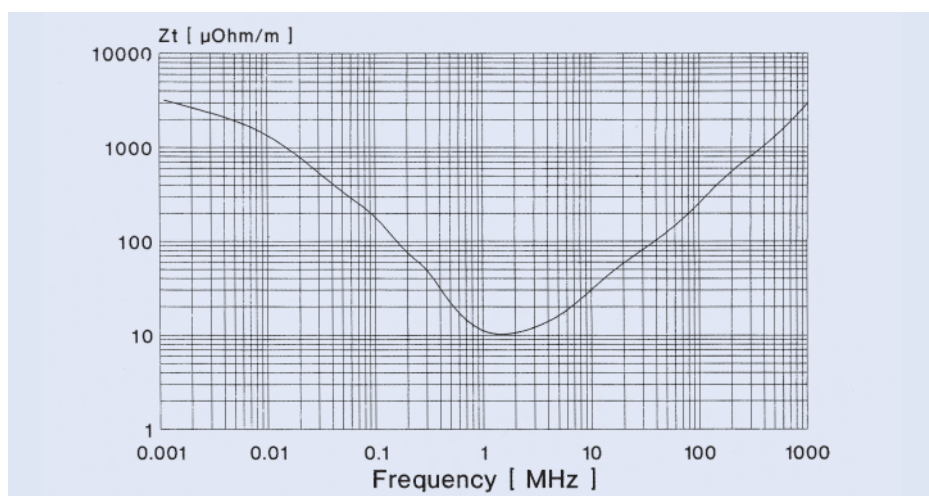
Radiation susceptibility :
CMS/RG compared to
standard coaxial cable



Typical transfer
impedance Z_T related to
screen resistance R_{DC}
versus frequency -
CMS types



Typical transfer
impedance Z_T related to
screen resistance R_{DC}
versus frequency -
LTI / RG 58



CMS/RG	Weight (kg/km)	C' (pF/m)	R_{DC} (screen) (mΩ/m)	Part number
RG 58 - 50 Ω	69	101,0	24,0	3032
RG 214 - 50 Ω	308	101,0	2,5	6416

Technical data for standard CMS cables
Attenuation values: see our catalogue "RF Cables"

7. LOW PASS SCREENED CABLES FOR DOMESTIC AND INDUSTRIAL INSTALLATION - VMVB

KABELWERK EUPEN developed a special cable that reduces considerably the influence of 50 or 60 Hz fields generated by electrical installations.

The HF components of the electromagnetic field are absorbed by the conductor's ferrite coating (EMC/COM). Effective protection against 50 or 60 Hz magnetic fields is obtained through a very short length of twist ; this considerably reduces the radiated magnetic field. The ferrite layer keeps this reduced magnetic field within the cable instead of allowing it to "break out".
The cable's static screen grants excellent protection against 50 or 60 Hz electric fields.

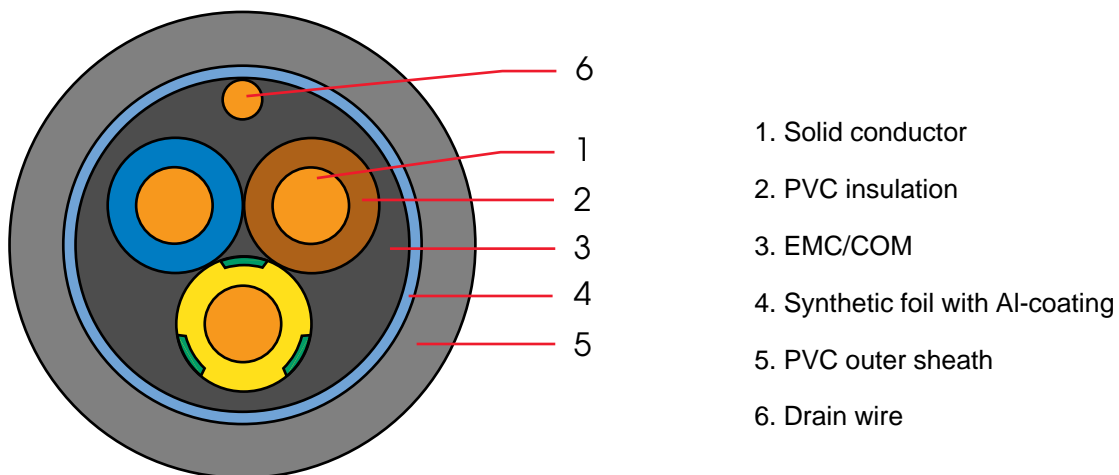
TYPICAL USE : * installation or mains cable for all applications where effective protection against low frequency magnetic fields and RFI are a priority

TYPES : * Standard : 3G1,50 mm²
3G2,50 mm²
5G1,50 mm²
5G2,50 mm²

Colour : outer sheath grey

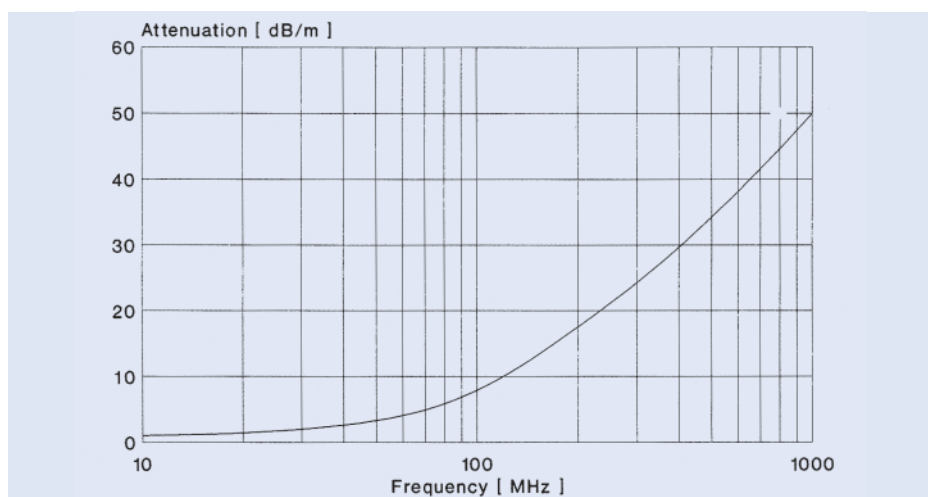
* Upon request : same sections in GMGB version, i.e. with isolation and green coloured outer sheath in halogen free materials

CONSTRUCTION :



CHARACTERISTICS :

Typical attenuation
versus frequency -
all types



VMVB	Weight (kg/km)	Part number
3G1,50 mm ²	260	8800
3G2,50 mm ²	339	5279
5G1,50 mm ²	356	9008
5G2,50 mm ²	466	5281

Technical data for standard VMVB types

MAGNETIC FIELD ATTENUATION AT 50 OR 60 Hz :

Results of measurements on VMVB 5G2,5 mm²

TEST SAMPLES :

- * 15 m standard installation cable to Belgian norm VVB 5G2,5 corresponds to German NYM 5G2,5 or NYY 5G2,5
- * 15 m ferrite coated cable VMVB 5G2,5

TEST CONDITIONS :

- * Net voltage 3 x 380 V, star shaped
- * Distance magnetic field probe - cable : 20 cm
- * Loads connected :

	Test 1	Test 2	Test 3
N - R	0 W	0 W	0 W
N - S	0 W	1000 W	1000 W
N - T	0 W	0 W	3000 W



RESULTS :

Magnetic field 50 Hz	Test 1	Test 1	Test 2	Test 3
	non-energized	energized	energized	energized
VVB 5G2,5 mm ²	21,0 nT	21,0 nT	95,2 nT	512,0 nT
VMVB 5G2,5 mm ²	21,0 nT	21,0 nT	30,2 nT	32,7 nT

CONCLUSIONS : Even with an asymmetrical load connected, the VMVB 5G2,5 mm² cable radiates a very small magnetic field, mainly because of the small length of twist used on this cable. The electrical field in the neighbourhood is not subject to any changes, because the cable is screened.