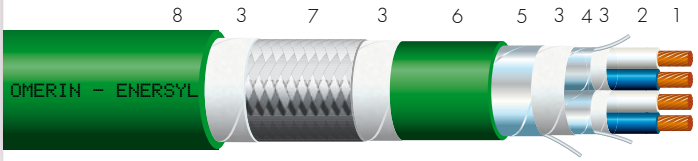
ENERSYL® ZH INSTRUM

Instrumentation cables



1 • Stranded bare copper core, class 2 as per IEC 60228.
2 • Insulation: cross-linked halogen-free polyolefine + optional filler(s).
3 • Optional separating tape.
4 • (optional) Individual electrical screen (EI): aluminium/PET tape + continuity wire.
5 • General electrical screen: aluminium/PET tape + continuity wire (EG) / tin-plated copper braid (BE) / bare copper braid (BR).
6 • (optional) Internal sheath: HFFR, type ST8 as per IEC 60502-1.
7 • (optional) Armour: galvanized steel braid (BG) / double steel tape (FA).
8 • Outer sheath: HFFR, type ST8 as per IEC 60502-1.

Reference

• (example) ENERSYL® ZH EI BG INSTRUM 2P1,5 mm²
ZH: halogen free
EI, EG, BE, BR: type of electrical screen
BG, FA: type of armour
INSTRUM: instrumentation cable
2 : number of pairs, triples or quads
P,T,Q: pairs, triples or quads
1.5 mm²: cross-section in mm²

Approvals - standards

• IEC 60228.
• IEC 60332-1 / IEC 60332-3.
• IEC 61034-2 / IEC 60754-1 / IEC 60754-2.

Markings

• OMERIN – ENERSYL < ZH xx xx INSTRUM >
< cross-section > – 300/500V – < batch > – < year >

Standard products

• **Sheath**: green.
• **Colour identification of conductors**:
> Pair: white and blue numbered.
> Triple: white, red and blue numbered.
> Quad: white, black, red and blue numbered.

Technical characteristics

Thermal

• Continuous operating temperature: -30 °C to +80 °C.
• Maximum core temperature: +90 °C.

Electrical

• Rated voltage: 300/500 V.
• Test voltage: 2000 V.

Smoke - fire

• Flame retardant – cable alone:
IEC 60332-1-2 / NF EN 60332-1-2 / NF C 32-070 test C2.
• Flame retardant – bunched cable:
IEC 60332-3-24 cat. C / NF EN 60332-3-24 cat. C.
• Low smoke density: IEC 61034-2 / NF EN 61034-2.
• Halogen-free: IEC 60754-1 / NF EN 60754-1.
• Low corrosivity of gas emissions: IEC 60754-2 / NF EN 60754-2.

Resistance of outer sheath to chemical attacks as per OMERIN test report NT140220-01:

• Good resistance to acid.
• Good resistance to base.
• Fairly good resistance to aliphatic hydrocarbons.
• Resistance to water: type AD7 as per IEC 60529 without immersion of ends.
• Resistance to UV ≥ 2000 hours as per EN 16472.

Options

• **FLEX**: flexible tin-plated copper core, class 5 as per IEC 60228.
(0.9 mm² cross-section replaced by 1 mm²).
• **C1**: Fire retardant cable as per NF C 32-070 test C1: contact us.
• **Other colours**: contact us.
• **105 °C cable**: contact us.
• **ATEX** as per EN 60079-14.
Particularly suited for static facilities in potentially explosive environments with "i" intrinsic safety protection mode, requiring specific identification of cables.
Colour of the sheath: blue as per EN 60079-14 part 16.2.2.6.
> **ENERSYL® ZH EI BE EX INSTRUM:**
with individual electrical screen (aluminium/PET tape) and general (tin-plated copper braid).
> **ENERSYL® ZH EI EX INSTRUM:**
with individual and general electrical screen (aluminium/PET tape).
> **ENERSYL® ZH BE EX INSTRUM:**
with general electrical screen (tin-plated copper braid).
> **ENERSYL® ZH EG EX INSTRUM:**
with general electrical screen (aluminium/PET tape).

For this product, please contact:

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For an optimum use of the cables produced by our company, we recommend testing in real conditions. Our sales department is available for a possible provision of samples, and/or for the conditions of a complete study in our laboratories.
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Number of pairs, triples or quads	Nominal cross-section (mm²)	Nominal stranding	Maximum linear resistance at 20 °C (Ω/km)	Nominal thickness of insulation (mm)	Nominal diameter of conductors (mm)	NON-SHIELDED CABLES Nominal outside diameter* (mm)						ARMOURED CABLES Nominal outside diameter* (mm)					
						Pairs		Triples		Quads		Pairs		Triples		Quads	
						EG	EI	EG	EI	EG	EI	EG	EI	EG	EI	EG	EI
1	0.5	7 / 0.30	36.0	0.6	2.1	6.0		6.3		6.9		9.1		9.4		10.0	
2 **	0.5	7 / 0.30	36.0	0.6	2.1	6.9	9.7	10.0	11.0	12.7	13.1	10.0	12.9	13.2	14.4	16.3	16.7
3	0.5	7 / 0.30	36.0	0.6	2.1	9.4	10.2	10.6	11.9	13.7	14.1	12.6	13.6	13.8	15.3	17.3	17.8
4	0.5	7 / 0.30	36.0	0.6	2.1	10.4	11.1	11.9	13.3	15.0	15.7	13.8	14.5	15.3	16.9	18.7	19.5
5	0.5	7 / 0.30	36.0	0.6	2.1	11.6	12.6	13.4	14.7	16.6	17.2	15.0	16.2	16.8	18.4	20.7	21.2
6	0.5	7 / 0.30	36.0	0.6	2.1	12.8	13.9	14.5	16.3	18.2	18.8	16.4	17.5	18.2	20.1	22.3	22.9
7	0.5	7 / 0.30	36.0	0.6	2.1	12.8	13.9	14.5	16.3	18.2	18.8	16.4	17.5	18.2	20.1	22.3	22.9
8	0.5	7 / 0.30	36.0	0.6	2.1	14.6	15.6	16.5	18.4			18.3	19.5	20.4	22.4		
9	0.5	7 / 0.30	36.0	0.6	2.1	16.0	17.1	18.0	19.9			20.0	21.2	22.1	24.0		
12	0.5	7 / 0.30	36.0	0.6	2.1	17.2	18.6	19.4	21.7			21.3	22.6	23.5	26.0		
19	0.5	7 / 0.30	36.0	0.6	2.1	20.4	21.9	22.9	25.5			24.5	26.2	27.0	29.7		
24	0.5	7 / 0.30	36.0	0.6	2.1	23.9	25.6					28.1	30.1				
37	0.5	7 / 0.30	36.0	0.6	2.1	27.5	29.6					32.0	34.0				
1	0.9	7 / 0.40	20.6	0.6	2.4	6.6		7.0		7.6		9.7		10.1		10.8	
2 **	0.9	7 / 0.40	20.6	0.6	2.4	7.8	10.8	11.3	12.6	14.3	14.7	11.0	14.2	14.5	16.2	18.0	18.4
3	0.9	7 / 0.40	20.6	0.6	2.4	10.6	11.5	12.2	13.4	15.2	15.9	14.0	14.9	15.6	17.0	19.1	19.9
4	0.9	7 / 0.40	20.6	0.6	2.4	11.8	12.8	13.6	14.9	17.0	17.4	15.2	16.4	17.0	18.6	21.0	21.5
5	0.9	7 / 0.40	20.6	0.6	2.4	13.1	14.2	14.9	16.6	18.7	19.2	16.7	17.9	18.6	20.6	22.7	23.3
6	0.9	7 / 0.40	20.6	0.6	2.4	14.5	15.7	16.4	18.2	20.6	21.2	18.2	19.6	20.3	22.2	24.7	25.5
7	0.9	7 / 0.40	20.6	0.6	2.4	14.5	15.7	16.4	18.2	20.6	21.2	18.2	19.6	20.3	22.2	24.7	25.5
8	0.9	7 / 0.40	20.6	0.6	2.4	16.5	17.7	18.6	20.7			20.5	21.8	22.6	24.7		
9	0.9	7 / 0.40	20.6	0.6	2.4	18.0	19.2	20.3	22.4			22.0	23.3	24.4	26.7		
12	0.9	7 / 0.40	20.6	0.6	2.4	19.4	21.0	22.0	24.3			23.4	25.2	26.0	28.5		
19	0.9	7 / 0.40	20.6	0.6	2.4	22.9	24.6	26.0	28.7			27.1	28.8	30.2	33.2		
24	0.9	7 / 0.40	20.6	0.6	2.4	27.0	29.0					31.5	33.5				
37	0.9	7 / 0.40	20.6	0.6	2.4	31.2	33.5					35.8	38.2				
1	1.5	7 / 0.52	12.1	0.6	2.85	7.7		8.0		8.7		10.9		11.2		11.9	
2 **	1.5	7 / 0.52	12.1	0.6	2.85	8.9	12.8	13.4	14.6	16.7	17.1	12.1	16.4	16.6	18.3	20.8	21.2
3	1.5	7 / 0.52	12.1	0.6	2.85	12.6	13.7	14.3	15.6	17.9	18.3	16.2	17.3	18.0	19.5	22.0	22.4
4	1.5	7 / 0.52	12.1	0.6	2.85	14.0	15.0	15.9	17.4	19.9	20.4	17.7	18.7	19.7	21.4	24.0	24.4
5	1.5	7 / 0.52	12.1	0.6	2.85	15.3	16.6	17.4	19.1	21.8	22.4	19.2	20.7	21.2	23.2	26.1	26.6
6	1.5	7 / 0.52	12.1	0.6	2.85	16.9	18.2	19.1	21.1	23.9	24.5	21.0	22.3	23.1	25.2	28.2	28.8
7	1.5	7 / 0.52	12.1	0.6	2.85	16.9	18.2	19.1	21.1	23.9	24.5	21.0	22.3	23.1	25.2	28.2	28.8
8	1.5	7 / 0.52	12.1	0.6	2.85	19.1	20.7	21.7	23.8			23.2	24.8	25.7	28.1		
9	1.5	7 / 0.52	12.1	0.6	2.85	21.0	22.5	23.6	26.1			25.2	26.7	27.8	30.6		
12	1.5	7 / 0.52	12.1	0.6	2.85	22.6	24.3	25.7	28.3			26.9	28.6	29.9	32.7		
19	1.5	7 / 0.52	12.1	0.6	2.85	26.8	28.8	30.4	33.5			31.2	33.2	34.8	38.1		
24	1.5	7 / 0.52	12.1	0.6	2.85	31.6	34.0					36.3	38.7				
37	1.5	7 / 0.52	12.1	0.6	2.85	36.5	39.3					41.4	44.2				

* The rated outer diameter of cables may vary by +/- 20 % depending on the options selected.
** The two pairs with general electrical screen (EG) are twisted like a quad cable.

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