

# X-VOLT<sup>®</sup> AL

## RH5Z1-OL/-2OL

Medium voltage aluminium cable, XLPE insulation, halogen free with longitudinal aluminium strip screen.

ACCORDING TO: UNE-HD 620-10E2 / ENEL Global Standard GSC 001



# F<sub>ca</sub>

### APPLICATION

Aluminium cable for fixed installations. Halogen free. Suitable for transport and distribution of electric power in medium voltage networks. This cable is suitable for indoor, outdoor and buried installations.

### CONSTRUCTION

#### Conductor

Aluminium class 2 according to EN 60228 and IEC 60228. Optionally, with longitudinal water tightness (cable type -2OL).

#### Conductor screen

Screen over the conductor, made of thermosetting semiconductor material.

#### Insulation

Cross-linked polyethylene, type DIX-3 according to HD 620-1, natural colour. Cross-linked in catenary line with nitrogen atmosphere.

#### Insulation screen

Screen over the insulation, made of thermosetting semiconductor material. Strippable.

#### Water blocking

Semi-conducting swellable tape under metallic screen.

#### Metallic screen

Aluminium tape of thickness 0,3 mm longitudinally applied on the water-blocking. The tape is overlapped and bonded 5 mm minimum. The screen is longitudinally and continually fixed in the outer sheath.

#### Outer sheath

Polyethylene halogen free, type DMZ1 according to HD 620-1. Red colour.

### CHARACTERISTICS



#### Electrical performance

Medium voltage: 12/20 (24) kV  
18/30 (36) kV



#### Thermal performance

Maximum conductor temperature: 90°C.  
Minimum service temperature: -15°C.  
Minimum installation temperature: 0 °C.  
Maximum short-circuit temperature: 250°C (max 5 s).



#### Fire performance

Reaction to fire CPR: F<sub>ca</sub> according to EN 50575  
Halogen free according to EN 60754-1 / IEC 60754-1.  
Low corrosive gases emission according to EN 60754-2 / IEC 60754-2.



#### Mechanical performance

Minimum bending radius, fixed: 15x cable diameter.  
Minimum bending radius during installation: 20x cable diameter.  
Abrasion resistant.  
Impact resistance: AG4. Extra high severity.



#### Environmental performance

UV Resistant according to UNE 211605.  
Water resistance: AD8 Submersion.



#### Installation conditions

Open Air.  
Buried.  
In conduit.

### STANDARDS / COMPLIANCE



#### According to

UNE-HD 620-10E2 / ENEL Global Standard GSC001



#### Standards and approvals

AENOR / RETIE (18/30 (36) kV)

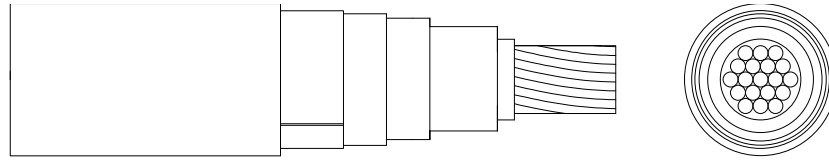


#### CPR (Construction Products Regulation)

F<sub>ca</sub>



### DIMENSIONS & ADMISSIBLE INTENSITIES



X-VOLT<sup>®</sup> RH5Z1-OL 12/20 (24) kV

Cross-section (mm <sup>2</sup> )	Conductor Diameter (mm)	Insulation Diameter (mm)	External Diameter (mm)	Width tape (mm)	Maximum Screen resistance 20°C (Ω/km)	Weight (Kg/Km)	R max. 20°C (Ω/km)	X (Ω/km)	C (μF/km)	Open air (A) <sup>1</sup>	Buried (A) <sup>2</sup>	In conduit (A) <sup>3</sup>
1 x 50	7,9	17,9	25,8	70	1,551	610	0,641	0,134	0,199	184	152	144
1 x 70 *	10,1	20,1	28,0	80	1,379	730	0,443	0,123	0,234	230	186	180
1 x 95	11,1	21,1	29,0	80	1,344	825	0,320	0,120	0,250	280	221	210
1 x 120 *	12,9	22,9	30,8	90	1,260	950	0,253	0,114	0,277	324	252	240
1 x 150	14,0	24,0	31,9	90	1,186	1.050	0,206	0,111	0,295	368	281	267
1 x 185	15,5	25,5	33,4	100	1,045	1.190	0,164	0,107	0,319	424	317	303
1 x 240	17,9	27,9	35,8	110	1,008	1.415	0,125	0,103	0,256	502	367	351
1 x 300 *	20,2	30,2	38,1	120	0,943	1.645	0,100	0,099	0,392	577	414	397
1 x 400	22,8	33,4	41,3	130	0,876	1.995	0,0778	0,097	0,442	673	470	451
1 x 500 *	26,4	36,9	44,8	130	0,817	2.335	0,0605	0,092	0,423	777	542	519
1 x 630	29,9	40,4	48,3	145	0,749	2.835	0,0469	0,089	0,551	895	615	588
1 x 800 *	34,1	45,4	53,5	165	0,665	3.510	0,0367	0,088	0,678	1.036	700	670
3 x 1 x 95	11,1	21,1	62,4	80	1,344	2.500	0,320	0,120	0,250	280	221	210
3 x 1 x 150	14,0	24,0	67,3	90	1,186	3.085	0,206	0,111	0,295	368	281	267
3 x 1 x 185	15,5	25,5	71,8	100	1,045	3.605	0,164	0,107	0,319	424	317	303
3 x 1 x 300 *	20,2	30,2	81,9	120	0,943	4.975	0,100	0,099	0,392	577	414	397
3 x 1 x 400	22,8	33,4	88,8	130	0,876	6.050	0,0778	0,097	0,442	673	470	451

\* Cable based on UNE-HD 620-10E2

<sup>1</sup> Open air installation according to IEC 60502-2: three single-core cables in trefoil formation and ambient temperature of 30 °C; protected from direct sun radiation and with adequate ventilation (supported by cleats and hangers or on perforated tray).

<sup>2</sup> Buried installation according to IEC 60502-2: three single-core cables in trefoil formation direct buried at a depth of 0,8 m, ground temperature of 20 °C and soil thermal resistivity of 1,5 K-m/W.

<sup>3</sup> Buried installation according to IEC 60502-2: three single-core tubed cables (one cable per tube) in trefoil formation and buried tubes in mutual contact at a depth of 0,8 m, ground temperature of 20 °C, soil thermal resistivity of 1,5 K-m/W and thermal resistivity of the tube of 1,2 K m/W.

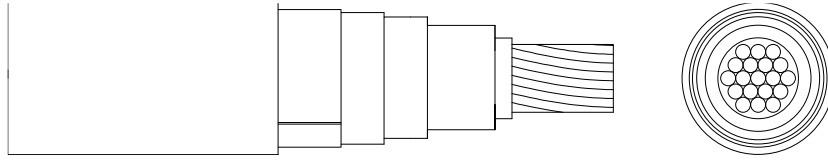
Reactance (X) is calculated at 50 Hz and for three single-core cables (in triangle or trefoil formation).

Capacitance values (C) are calculated in base to dimensional items of the cables that are in this specification.

In all cases are supposed a three-phase circuit.

# X-VOLT<sup>®</sup> AL

## RH5Z1-OL/-2OL



X-VOLT<sup>®</sup> RH5Z1-OL 18/30 (36) kV

Cross-section (mm <sup>2</sup> )	Conductor Diameter (mm)	Insulation Diameter (mm)	External Diameter (mm)	Width tape (mm)	Maximum screen resistance 20°C (Ω/km)	Weight (Kg/Km)	R max. 20°C (Ω/km)	X (Ω/km)	C (μF/km)	Open air (A) <sup>1</sup>	Buried (A) <sup>2</sup>	In conduit (A) <sup>3</sup>
1 x 50	7,9	22,1	30,5	90	1,260	795	0,641	0,143	0,153	184	152	144
1 x 95	11,1	25,3	33,2	100	1,045	1.035	0,320	0,128	0,188	280	221	210
1 x 120 *	12,9	27,1	35,0	100	1,027	1.160	0,253	0,122	0,207	324	252	240
1 x 150	14,0	28,2	36,1	110	1,008	1.260	0,206	0,119	0,220	368	281	267
1 x 185	15,5	29,7	37,6	110	0,960	1.420	0,164	0,115	0,236	424	317	303
1 x 240	17,9	32,1	40,0	120	0,877	1.660	0,125	0,110	0,262	502	367	351
1 x 300 *	20,2	34,4	42,3	130	0,826	1.890	0,100	0,106	0,287	577	414	397
1 x 400	22,8	37,6	45,5	140	0,775	2.270	0,0778	0,103	0,321	673	470	451
1 x 500 *	26,4	41,1	49,0	150	0,726	2.635	0,0605	0,098	0,358	777	542	519
1 x 630	29,9	44,6	52,5	165	0,672	3.150	0,0469	0,095	0,395	895	615	588
1 x 800 *	34,1	49,6	57,7	185	0,627	3.865	0,0367	0,092	0,448	1.036	700	670
1 x 1000 *	38,4	53,9	62,0	190	0,571	4.600	0,0291	0,089	0,494	1.188	795	757
3 x 1 x 95	11,1	25,3	71,4	100	1,045	3.135	0,320	0,128	0,188	280	221	210
3 x 1 x 150	14,0	28,2	77,6	110	1,008	3.825	0,206	0,119	0,220	368	281	267
3 x 1 x 185	15,5	29,7	80,8	110	0,960	4.300	0,164	0,115	0,236	424	317	303
3 x 1 x 240	17,9	32,1	86,0	120	0,877	5.025	0,125	0,110	0,262	502	367	351
3 x 1 x 300 *	20,2	34,4	90,9	130	0,826	5.730	0,100	0,106	0,287	577	414	397
3 x 1 x 400	22,8	37,6	97,8	140	0,775	6.870	0,0778	0,103	0,321	673	470	451
3 x 1 x 500 *	26,4	41,1	105,4	150	0,726	7.975	0,0605	0,098	0,358	777	542	519
3 x 1 x 630	29,9	44,6	112,9	165	0,672	9.545	0,0469	0,095	0,395	895	615	588

\* Cable based on UNE-HD 620-10E2

<sup>1</sup> Open air installation according to IEC 60502-2: three single-core cables in trefoil formation and ambient temperature of 30 °C; protected from direct sun radiation and with adequate ventilation (supported by cleats and hangers or on perforated tray).

<sup>2</sup> Buried installation according to IEC 60502-2: three single-core cables in trefoil formation direct buried at a depth of 0,8 m, ground temperature of 20 °C and soil thermal resistivity of 1,5 K-m/W.

<sup>3</sup> Buried installation according to IEC 60502-2: three single-core tubed cables (one cable per tube) in trefoil formation and buried tubes in mutual contact at a depth of 0,8 m, ground temperature of 20 °C, soil thermal resistivity of 1,5 K-m/W and thermal resistivity of the tube of 1,2 K m/W.

Reactance (X) is calculated at 50 Hz and for three single-core cables (in triangle or trefoil formation).

Capacitance values (C) are calculated in base to dimensional items of the cables that are in this specification.

In all cases are supposed a three-phase circuit.

### SHORT-CIRCUIT CURRENT-CARRYING CAPACITIES

<b>Time (s)</b>	0,1	0,2	0,3	0,5	1	1,5	2	2,5	3
<b>A/mm<sup>2</sup></b>	299	211	173	134	94	77	67	60	55

### MAXIMUM CURRENT-CARRYING IN THE SCREEN, ACCORDING TO UNE 21192, TAKING 75°C AS INITIAL TEMPERATURE AND 150°C AS FINAL TEMPERATURE

	Tape width (mm)	Time (s)			
		0,2	0,5	1	2
<b>Maximum short-circuit current in metallic screen (kA)</b>	70	3,98	2,77	2,14	1,69
	85	4,84	3,36	2,60	2,05
	95	5,41	3,75	2,91	2,29
	100	5,69	3,95	3,06	2,41
	110	6,26	4,35	3,37	2,65
	120	6,83	4,75	3,67	2,90
	130	7,40	5,14	3,98	3,14
	140	7,97	5,54	4,29	3,38
	150	8,54	5,93	4,59	3,62
	160	9,11	6,33	4,90	3,86
	165	9,40	6,53	5,05	3,98
	185	10,5	7,32	5,67	4,47
190	10,8	7,52	5,82	4,59	

### CORRECTION FACTORS FOR AIR TEMPERATURE

<b>Air T. (°C)</b>	20	25	30	35	40	45	50	55	60
<b>Factor</b>	1,08	1,04	1	0,96	0,91	0,87	0,82	0,76	0,71

### CORRECTION FACTORS FOR GROUND TEMPERATURE

<b>Ground T. (°C)</b>	10	15	20	25	30	35	40	45	50
<b>Factor</b>	1,07	1,04	1	0,96	0,93	0,89	0,85	0,80	0,76

### CORRECTION FACTORS FOR THERMAL RESISTIVITY OF THE GROUND IN CABLES DIRECTLY BURIED

Thermal resist. (K·m/W)	0,8	1	1,5	2	2,5	3
50 mm <sup>2</sup>	1,26	1,16	1	0,89	0,81	0,74
95 mm <sup>2</sup>	1,28	1,18	1	0,89	0,80	0,74
120 mm <sup>2</sup>	1,28	1,18	1	0,88	0,80	0,74
150 mm <sup>2</sup>	1,28	1,18	1	0,88	0,80	0,74
185 mm <sup>2</sup>	1,29	1,18	1	0,88	0,80	0,74
240 mm <sup>2</sup>	1,29	1,18	1	0,88	0,80	0,73
300 mm <sup>2</sup>	1,30	1,19	1	0,88	0,80	0,73
400 mm <sup>2</sup>	1,30	1,19	1	0,88	0,79	0,73

### CORRECTION FACTORS FOR THERMAL RESISTIVITY OF THE GROUND IN TUBED CABLES BURIED

Thermal resist. (K·m/W)	0,8	1	1,5	2	2,5	3
50 mm <sup>2</sup>	1,18	1,12	1	0,91	0,84	0,78
95 mm <sup>2</sup>	1,19	1,13	1	0,91	0,84	0,78
120 mm <sup>2</sup>	1,20	1,13	1	0,91	0,84	0,78
150 mm <sup>2</sup>	1,20	1,13	1	0,91	0,84	0,78
185 mm <sup>2</sup>	1,21	1,14	1	0,90	0,83	0,77
240 mm <sup>2</sup>	1,21	1,14	1	0,90	0,83	0,77
300 mm <sup>2</sup>	1,21	1,14	1	0,90	0,83	0,77
400 mm <sup>2</sup>	1,21	1,14	1	0,90	0,83	0,77

Other correction factors (for grouping cables, for harmonic currents), that are not in this specification, can be applied. Further information can be found in IEC 60502-2.