

# Product Launch Package Instrumentation Cables



**HELUDATA<sup>®</sup> EN 50288-7**



**HELUDATA<sup>®</sup> EN 50288-7 FIRE RES**

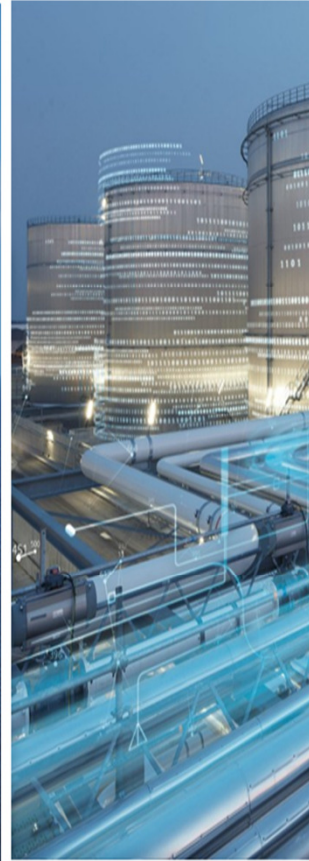
**HELUDATA<sup>®</sup> PLTC UL13**

**HELUTHERM<sup>®</sup> PLTC UL 13 / ANSI MC 96.1**



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## What is instrumentation?



**INSTRUMENTATION – control – sensor/measure – manage  
and switch / open and close**

Applications

Industries

Comparison

Properties



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## Typical applications:



Instrumentation at valve control (e. g. gas supply)

Instrumentation in the food and beverage industry



Instrumentation in water treatment

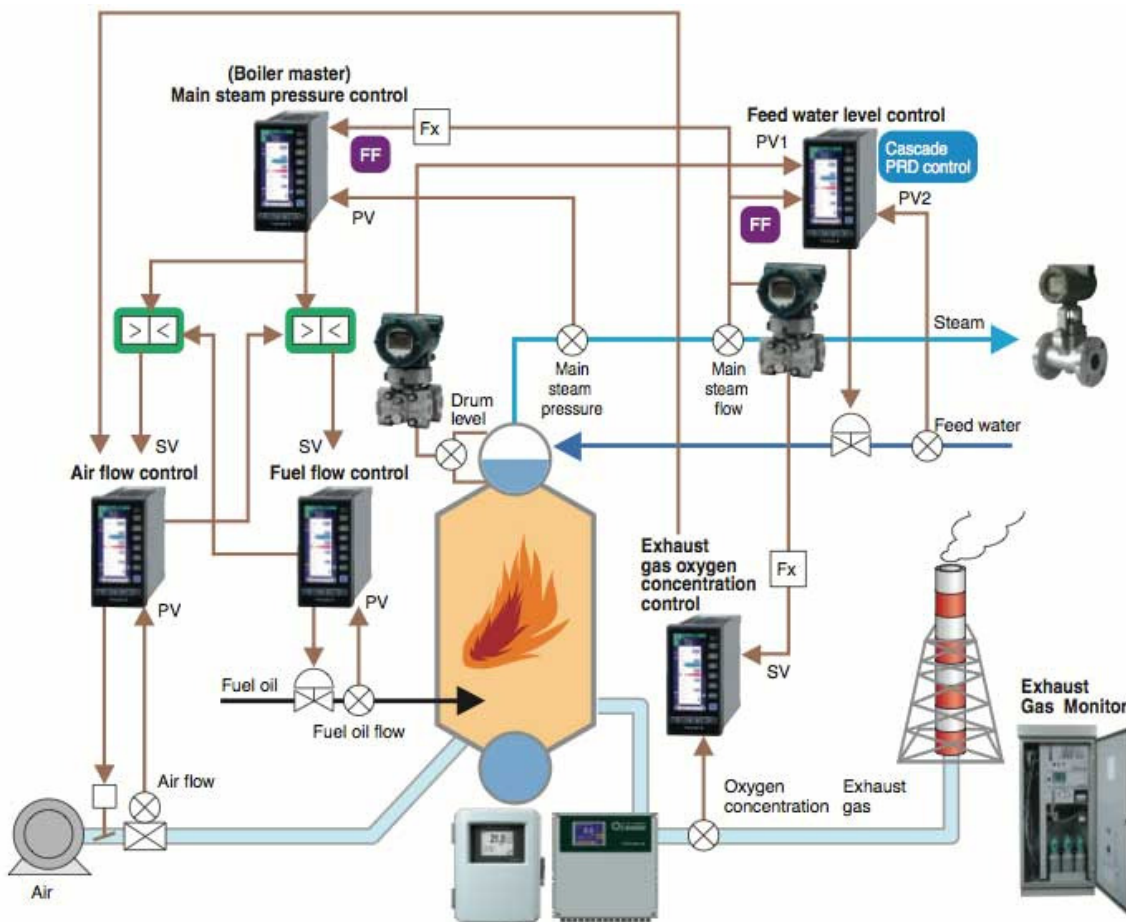


Instrumentation in the pharma industry



Instrumentation in the paper industry

## Typical applications:



include any application that requires the transmission of digital or analog data and/or control signals to a control room or device.

Most common field devices / instruments include:

- liquid measuring devices
- temperature controls
- flow control instruments
- pressure valves
- gas monitoring devices

Especially for use in harsh environments where uncompromising safety and signal quality is required over long distances.



## Typical industries / customer segments:



power utility providers



petrochemical plants



onshore refineries



oil & gas drilling stations



mining companies



steel mills and glass production companies



cement plants



food and beverage processing plants

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## Explanation of descriptions

There are instrumentation cables acc. to several norms. Depending on the norm different descriptions are common. That can be confusing. Therefore, in the following you can see the most typical descriptions.

for the EN norm it is usually applicable:

- OS = **o**verall screened with aluminium/plastic foil which means all pairs/triads/quads are screened together
- IOS = **i**ndividual and **o**verall screen with aluminium/plastic foil which means all pairs/triads/quads are first screened element by element and additionally all are screened together
- OSA = like OS but with additional inner sheath and steel wire armour
- IOSA = like IOS but with additional inner sheath and steel wire armour

Sometimes the descriptions are different again (often acc. to PAS or BS):

- OS = **C**AM (collective screen)
- IOS = **I**AM/**C**AM (individual and collective screen)
- SWA = **s**teel **w**ire **a**rmour



## Alternative descriptions, often used in Germany

RE = Rechnerkabel (German for computer cable)

<b>RE-2Y(St)Y</b>	PE Insulation(screen)PVC outer sheath
<b>RE-2Y(St)Y PiMF</b>	PE Insulation(screen)PVC outer sheath, pairs in metal foil
<b>RE-2Y(St)YRY</b>	PE Insulation(screen)PVC inner sheath/armour/PVC outer sheath
<b>RE-2Y(St)YRY PiMF</b>	PE Insulation(screen)PVC inner sheath/armour/PVC outer sheath, pairs in metal foil

Types with other insulation or sheath materials are also described by that pattern:

<b>Y</b>	PVC insulation or sheath
<b>2Y</b>	PE insulation or sheath
<b>H</b>	Halogen-free insulation or sheath
<b>2X</b>	XLPE(= cross-linked PE) insulation or sheath



## Comparison PAS 5308 | EN 50288-7 | PLTC UL13

	PAS 5308	EN 50288-7	PLTC UL13
Cross section	0.5 – 2.5 mm <sup>2</sup>	0.5 – 2.5 mm <sup>2</sup>	AWG 18 - 14
Core insulation	Part 1: PE, XLPE (EN 50290-2) Part 2: PVC (EN 50290-2)	XLPE, PVC (EN 50290-2)	XLPE, PVC HT 105
Core identification	colour code acc. to BS 5308	number coded acc. to IEC 60189-2 or IEC 60708-1	white, black, (red)
Screen	Aluminium/Polyester foil and tinned copper drain wire (individual and overall)	AL/PE foil with tinned copper drain wire (individual and overall)	AL/PE foil with tinned copper drain wire (individual and overall)
Outer sheath	PVC (EN 50290-2)	PVC, LSOH (EN 50290-2)	XLPE, PVC
Temperature	80° or 90°C	70° or 90°C	75°C to 80°C 90°C to 105°C at conductor
voltage	300/500 V	300 V or 500 V	300 V
UV resistance		Yes	yes
Flame test	IEC 60332-3-24 (Kat. C, 20 min)	IEC 60332-3-22 (Kat. A, 40 min)	IEC 60332-3-22 (Kat. A, 40 min) UL 1685 FT4 / IEEE 1202

Applications

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# INSTRUMENTATION CABLE EN-50288-7

## Typical elements of instrumentation cables acc. to EN 50288-7:

- conductor
  - Bare copper class 2
  - Cross sections 0.5 – 2.5 mm<sup>2</sup>
- Core insulation
  - XLPE, PVC
- stranding
  - in pairs, triads, quads
- screening
  - Pairs, triads, quads individual and/or overall
  - Aluminium/Polyester tape and tinned copper drain wire
- Arour
  - Steel Wire Armour**
- Outer sheath
  - PVC, LSOH



Material properties	
Temperature fixed	-30°C to +70°C (XLPE +90°C)
Nominal voltage	300 or 500 V
Test voltage	2000 V
Bending radius fixed	7,5 or 10* x Kabel $\varnothing$

Construction	
Conductor	Bare copper cl. 2
Core insulation	XLPE / PVC
Core identification	BK/WH -> 300V BK/BU -> 500V
Stranding	Pairs / Triads / Quads
Screen	individual and/or overall with AL/PE tape and drain wire
Inner sheath*	PVC / LSOH
Armour*	Galvanised steel wire armour
Outer sheath	PVC / LSOH

Technical properties
<ul style="list-style-type: none"><li>flame retardant according to IEC 60332-1 &amp; flame test on bunched wires acc. to IEC 60332-3-22 (Cat. A, 40 min), implies also IEC 60332-3-24 (Cat. C, 20 min)</li></ul>
<ul style="list-style-type: none"><li>suited for direct burial with steel wire armouring (SWA)</li></ul>
<ul style="list-style-type: none"><li>UV resistant acc. to UL 1581 section 1200</li></ul>
<ul style="list-style-type: none"><li>Oil resistant acc. to ICEA S-73-532 / NEMA WC 57</li></ul>



Description
PVC/OS/PVC
XLPE/OS/PVC
XLPE/OS/LS0H
PVC/IS/OS/PVC
XLPE/IS/OS/PVC
XLPE/IS/OS/LS0H
PVC/OS/PVC/SWA/PVC
XLPE/OS/PVC/SWA/PVC
XLPE/OS/LS0H/SWA/LS0H
PVC/IS/OS/PVC/SWA/PVC
XLPE/IS/OS/PVC/SWA/PVC
XLPE/IS/OS/LS0H/SWA/LS0H



OS  
(overall screened)



IS/OS  
(individual- and overall screened)



OS/SWA  
(overall screened with steel wire armour)



IS/OS/SWA  
(individual, overall screened and with steel wire armour)

Applications

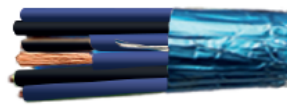
Industries

Comparison

Properties



**HELUKABEL®**



HELUDATA® EN-50288-7 FIRE RES OS 500 CE



HELUDATA® EN-50288-7 FIRE RES IOS 500 CE



HELUDATA® EN-50288-7 FIRE RES OSA 500 CE



HELUDATA® EN-50288-7 FIRE RES IOSA 500 CE

# HELUDATA® EN-50288-7 FIRE RES

## Four versions

MGT = Mica Tape

**HELUDATA<sup>®</sup> EN-50288-7 FIRE RES OS 500**  
**MGT/XLPE/OS/LS0H -> overall screened**

**HELUDATA<sup>®</sup> EN-50288-7 FIRE RES IOS 500**  
**MGT/XLPE/IS/OS/LS0H -> individual and overall screened**

**HELUDATA<sup>®</sup> EN-50288-7 FIRE RES OSA 500**  
**MGT/XLPE/OS/SWA/LS0H -> overall screened with steel wire armour**

**HELUDATA<sup>®</sup> EN-50288-7 FIRE RES IOSA 500**  
**MGT/XLPE/IS/OS/LS0H/SWA/LS0H -> individual and overall screened with steel wire armour**

Applications

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Comparison

Properties



\* Only valid for armoured version

Material properties	
Temperature fixed	-30°C to +90°C
Temperature fixed	-10°C to +90°C
Nominal voltage	500 V
Test voltage	2000 V
Bending radius fixed	7,5 or 10* x cable $\varnothing$

Construction	
Conductor	Bare copper cl. 2
Core insulation	XLPE
Core identification	Blue, black, red, grey, brown
Stranding	Pairs / Triads / Quads / 5 cores
Screen	individual and/or overall with AL/PE tape and drain wire
Inner sheath*	LSOH
Armour*	galvanised steel wire armour
Outer sheath	LSOH orange RAL 2004

## Technical properties

- Fire resistant acc. to IEC 60331-21
- Flame retardant acc. to IEC 60332-1 and flame test on bunched wires acc. to IEC 60332-3-22 (Cat. A, 40 min) and IEC 60332-3-24 (Cat. C, 20 min)
- Halogen-free acc. to IEC 60754-1
- Oil resistant acc. to ICEA S-73-532 / NEMA WC 57 / IEC 60811-404
- UV and sunlight resistant acc. to ISO 4892-3 & UL 1581 section 1200
- Suitable for usage in explosive atmospheres acc. to IEC 60079-14 sec. 16.2.2

Applications

Industries

Comparison

Properties



**HELUKABEL®**



# HELUDATA® PLTC UL13 PVC/PVC



## Four versions

**HELUDATA<sup>®</sup> PLTC UL13 PVC HT 105/PVC OS 300**  
**PVC/OS/PVC -> overall screened**

**HELUDATA<sup>®</sup> PLTC UL13 PVC HT 105/PVC IOS 300**  
**PVC/IS/OS/PVC -> individual and overall screened**

**HELUDATA<sup>®</sup> PLTC UL13 PVC HT 105/PVC OSA 300**  
**PVC/OS/PVC/SWA/PVC -> overall screened with steel wire armour**

**HELUDATA<sup>®</sup> PLTC UL13 PVC HT 105/PVC IOSA 300**  
**PVC/IS/OS/PVC/SWA/PVC -> individual and overall screened with steel wire armour**

Applications

Industries

Comparison

Properties



\* Only valid for armoured version

Material characteristics	
Temperature flexing	-5°C to +50°C
Temperature fixed	-30°C to +80°C
Temperature at the conductor	-30°C to +105°C
Nominal voltage	300 V
Test voltage	2000 V
Bending radius fixed	8 or 14* x cable Ø

Construction	
Conductor	class B: stranded, bare copper acc. to ASTM B3 and B8
Core insulation	PVC HT 105
Core identification	Blue, black, (red)
Stranding	Pairs / Triads
Screen	individual and/or overall with AL/PE tape and drain wire
Inner sheath*	PVC
Armour*	Galvanised steel wire armour
Outer sheath	PVC (black or blue)

## Technical properties

- Flame retardant acc. to IEC 60332-1 / UL VW-1 / UL 1581 sec. 1060 (FT1)
- Flame test on bunched wires acc. to IEC 60332-3-22 (Cat. A, 40 min, implies aslo IEC 60332-3-24 (Cat. C, 20 min) / UL VW-1 / UL 1581 sec. 1060 (FT1) / UL 1685 FT4 / IEEE 1202
- Installation in hazardous areas acc. to IEC 60079-14 ANNEX E, but only using the correct ATEX conform accessories.
- Oil resistant acc. to ICEA S-73-532 / NEMA WC 57 / IEC 60811-404
- UV and sunlight resistant acc. to UL 1581 section 1200

Applications

Industries

Comparison

Properties



# HELUDATA® PLTC UL13 XLPE/LS0H



## Four versions

**HELUDATA® PLTC UL13 XLPE/LS0H OS 300**  
**XLPE/OS/LS0H -> overall screened**

**HELUDATA® PLTC UL13 XLPE/LS0H IOS 300**  
**XLPE/IS/OS/LS0H -> individual and overall screened**

**HELUDATA® PLTC UL13 XLPE/LS0H OSA 300**  
**XLPE/OS/LS0H/SWA/LS0H -> overall screened with steel wire armour**

**HELUDATA® PLTC UL13 XLPE/LS0H IOSA 300**  
**XLPE/IS/OS/LS0H/SWA/LS0H -> individual and overall screened with steel wire armour**



Material characteristics	
Temperature flexing	-5°C to +50°C
Temperature fixed	-30°C to +75°C
Temperature at the conductor	-30°C to +90°C
Nominal voltage	300 V
Test voltage	2000 V
Bending radius fixed	8 or 14* x cable $\varnothing$

Construction	
Conductor	class B: stranded, bare copper acc. to ASTM B3 and B8
Core insulation	XLPE
Core identification	Blue, black, (red)
Stranding	Pairs / Triads
Screen	individual and/or overall with AL/PE tape and drain wire
Inner sheath*	LSOH
Armour*	Galvanised steel wire armour
Outer sheath	LSOH (black or blue)

## Technical properties

- Flame retardant acc. to IEC 60332-1 / UL VW-1 / UL 1581 sec. 1060 (FT1)
- Flame test on bunched wires acc. to IEC 60332-3-22 (Cat. A, 40 min, implies also IEC 60332-3-24 (Cat. C, 20 min) / UL VW-1 / UL 1581 sec. 1060 (FT1) / UL 1685 FT4 / IEEE 1202
- Halogen-free acc. to IEC 60754-1
- Installation in hazardous areas acc. to IEC 60079-14 ANNEX E, but only using the correct ATEX conform accessories
- Oil resistant acc. to IEC 60753-532 / NEMA WC 57 / IEC 60811-404
- UV and sunlight resistant acc. to UL 1581 section 1200

Applications

Industries

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# HELUTHERM® PLTC UL 13 / ANSI MC 96.1



## Thermocouple extension cables

### Two versions

1. HELUTHERM® PLTC UL 13 / ANSI MC 96.1 PVC/PVC
2. HELUTHERM® PLTC UL 13 / ANSI MC 96.1 XLPE/LSOH

With several types per version which differentiate in conductor material

Typ K/KX = NiCr(+) / Cu-Ni(-)

Typ J/JX = Fe(+) / Cu-Ni(-)

Typ T/TX = Cu(+) / Cu-Ni(-)

Typ E/EX = NiCr (+) / Cu-Ni(-)

colour code acc. to ANSI MC 96.1 see on the right



ANSI MC 96.1

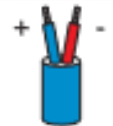
Identification

THL

AGL

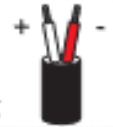
TX

0°C to +100°C



JX

0°C to +200°C



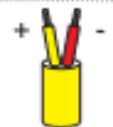
EX

0°C to +200°C



KX

0°C to +200°C



Applications

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Properties

Verfügbarkeit



Material characteristics	
Temperature flexing	-5°C to +50°C
Temperature at the conductor	-30°C to +105°C (core)
Nominal voltage	300 V
Test voltage	2000 V
Bending radius fixed	8 cable $\varnothing$

construction	
Conductor	Special solid alloys acc. to ANSI MC 96.1
Core insulation	PVC HT 105 or XLPE
Core identification	Several, see previous slide
Stranding	pairs
screen	Overall with AL/PE tape and drain wire
Inner sheath	PVC or LSOH
Outer sheath	Outer sheath colour acc. to ANSI MC 96.1
Armour	Yes and no, depending on type

Technical properties
• Flame retardant acc. to IEC 60332-1
• Flame test on bunched wires acc. to IEC 60332-3-22 (cat. A = 40 min) and IEC 60332-3-24 (cat. C = 20 min) and UL 1685
• hydrocarbon resistant acc. to IRAM IAP
• XLPE/LSOH version = halogen-free acc. to IEC 60754-1
• PVC/PVC version = low amount of halogen acid gas acc. to IEC 60754-1 (max. 1.3 %)
• UV resistant acc. to UL 1581 section 1200

Applications

Industries

Comparison

Properties