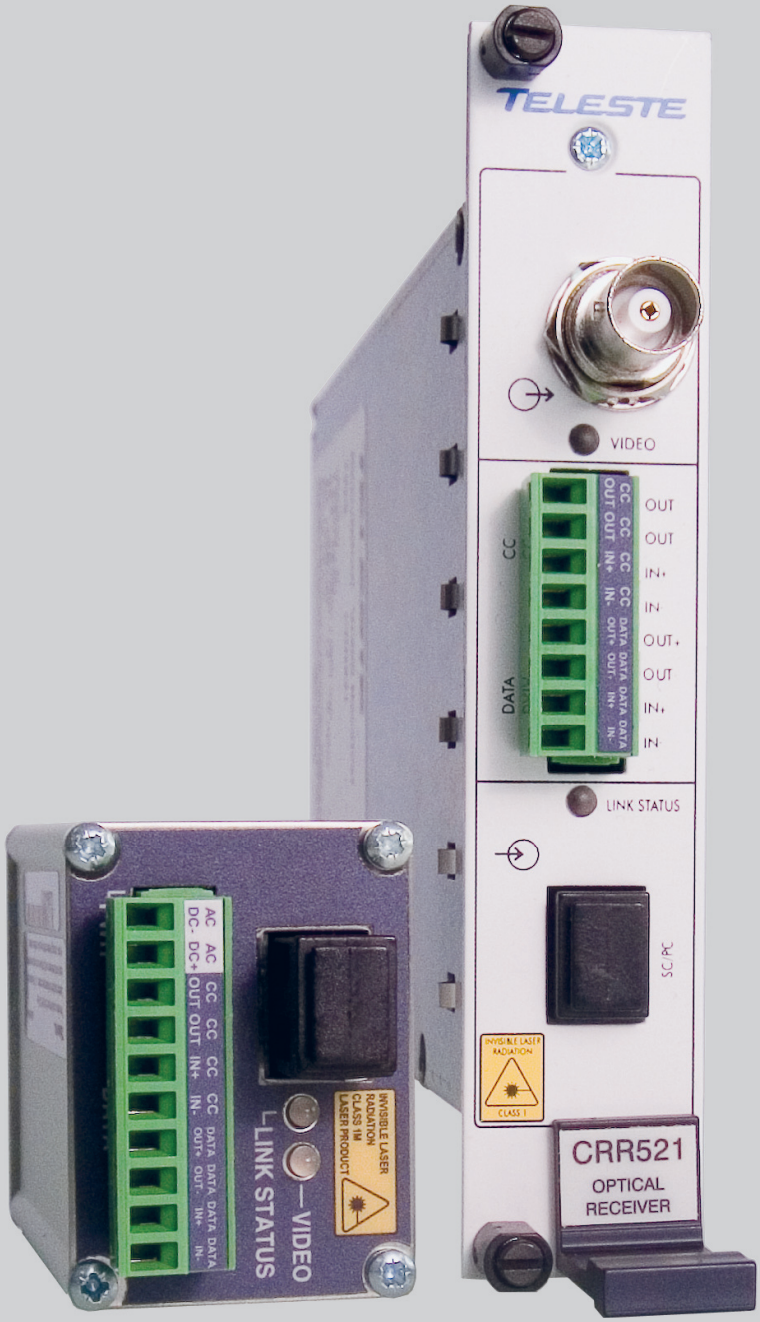
User manual

CFO331/521/541 one channel video link

CFO First Mile series consist of fibre optic modems which provide a high quality and losless video transmission for variety of CCTV applications



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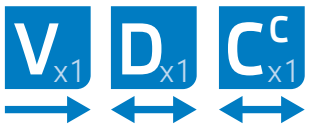
CFO331/521/541 singlemode 1 channel video link for uni-directional video and bi-directional data and contact closure transmission for variety of CCTV applications.



Welcome, and thank you for purchasing Teleste's CFO Products.

General

These one channel video link units offer a 10-bit video transmission with one bi-directional data and one contact closure channel over one singlemode fibre **(CFO521 & 541)** or over one multimode fibre **(CFO331)**.

PAL, **NTSC** and **CVBS** video formats are supported to provide a transparent video transmission. All common data protocols are supported as well and are easily configured by **DIP** switches. Optical transmission is based on **class 1M laser** operation. The multiplexed data stream of 202.5 Mbps enables a full quality and a real-time video transmission in one multimode fibre up to 5 km (CFO331), singlemode fiber up to 20 km (CFO521) and 60 km (CFO541) typical transmission distance.

The primary application is a point-to-point transmission from camera to monitoring centre. In advanced video network systems the CFO331/521/541 offers a flexible way for first mile transfer to the nearest collection point of a larger scale network.

The CPT331/521/541 stand-alone transmitters are capable of using both 12 VDC or 24 VAC supply voltage. **CPT331/521/541 unit is a compact size housing for special stand-alone installations requiring minimal installation space. Also as an optional DIN rail mounting is possible (item code CIK001).**

All CRR331/521/541 units are compatible with all CFO rack systems. Stand-alone options are available with the CMA011 module adapter and separared CPS series mains adapter.

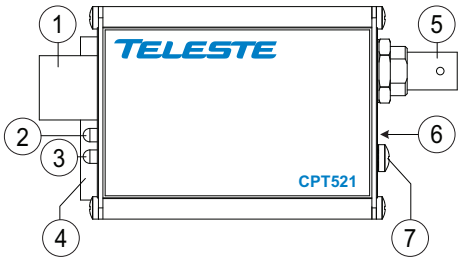
As with all CFO platform products these specific models do meet all typical EMC as well as other environmental and manufacturing related requirements.

Features

- High performance uncompressed zero delay digital video transmission, SNR 67 dB typical, 10 bit video sampling
- One CVBS (PAL/NTSC) video channel
- One bi-directional data interface, compatible with EIA232/422/485
- Data rate up to 230 kbps
- One bi-directional contact closure
- Transmission on one multimode fibre up to 5 km (CFO331)
- Transmission on one singlemode fibre up to 20/60 km (CFO521/541)
- Units for rack mount or stand-alone installations
- Mechanically compact and ruggedised
- Transmitter unit available in a special small-size stand-alone design (CPT)

CPT - Mini sized stand-alone video transmitter

side view



CPT331/521/541 Optical Transmitter

1) Optical input/output (SC/PC)
2) Link status indicator led
3) Video indicator led
4) Screw terminal connector (10-pin)
5) Video input (BNC female)
6) DIP switches for data connection selection
7) Grounding

See further information on dedicated sections.

CAUTION:
THESE OPTICAL UNITS USES CLASS 1M LASER DIODE. DO NOT STARE INTO BEAM OR VIEW DIRECTLY WITH OPTICAL INSTRUMENTS. APPLICABLE STANDARD IEC60825-1: 2001

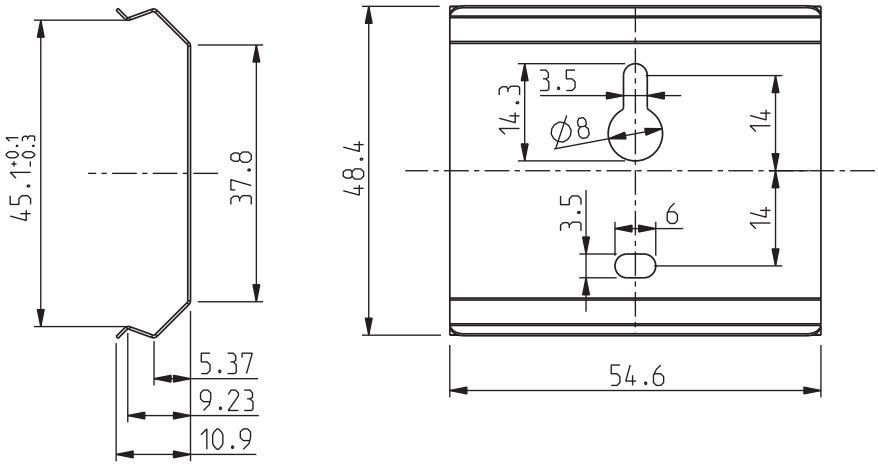
General

The **CPT331/521/541** is a one channel optical transmitter for uni-directional video transmission with one bi-directional data, and one contact closure channel. The current consumption is max. 250 mA (+12V DC).

Stand-alone installation

The **CPT331/521/541** units are designed for stand-alone installation. The unit should be mounted with a help of wall bracket to a installation place.

The supply voltage can be either +12V DC or 24V AC.
The supply voltage is provided by either a surveillance camera unit, or by an external mains adapter. The permitted supply voltage range are 10.5...14 VDC and 16...28 VAC. In DC use the +12V DC supply voltage is supplied by the means of a separate mains adapter with a regulated output, (e.g. **CPS231**). The permitted operational temperature range for CPT521 is from –10 to +70 °C and for CPT331/541 is from –34 to +74 °C.



Wall bracket dimensions.

Video connection and indicator led

The impedance of the video connection (BNC female) is 75 Ω.
The nominal input level is 1 Vpp. Video connection is equipped with the dual colour VIDEO led on the front panel. See next page for explanation of VIDEO indicator led's lights.

CSX Multiplexer operation

Alternatively the video channel can be used for **CSX** series multiplexer operation --> multiplexed audio/data/contact closure transmission.
No extra adjustments are needed.

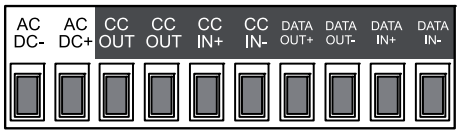
Colour	Status
Green	Video signal is present, in nominal level,and the unit detects video sync pulses
Green*	A signal is present and in nominal level
Yellow	No video signal, or the video level is too low

VIDEO indicator operation.

* When **CSX** series multiplexer operation is used.

Data connection

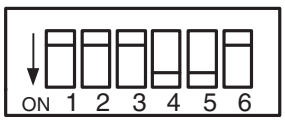
The **CFO331/521/541** link provides one bi-directional data channel (CPT <--> CRR). The connector in use is a screw terminal connector. Available data modes for data channel are **RS232**, **RS422**, **RS485-2w** and **RS485-4w**. See table below how to connect the desired data mode. The desired data connection must be confirm by the means of DIP switches. The desired data mode settings for data channel can be set by the means of receiver's DIP switches (see page 7 for detailed description). **The default factory setting is RS485-2w + dwelltime 75 µs, no line bias and no term.**



The screw terminal connector containing supply voltage, data and contact closure connections (10-pin).

Pin	RS232	RS422	RS485-2w	RS485-4w
Data in-		in -	in / out -	in -
Data in+	in	in +	in / out +	in +
Data out-	out	out -		out -
Data out+		out +		out +

Screw terminal connector's data pinout.



CPT331/521/541 DIP switches.
Transmitter data channel mode must set from receiver unit.

Data contact	DIP switch position					
	1	2	3	4	5	6
RS232	off	off	off	off	off	
RS422				off	off	
RS485-2w				on	on	
RS485-4w				off	off	
- line bias		on	on			
- no line bias		off	off			
- term	on					
- no term	off					
VSA						on

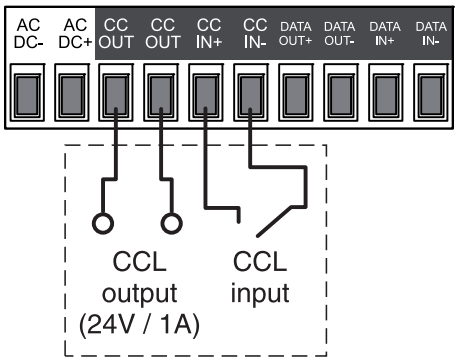
Data connection settings.

***Note!** If data cabling is requiring signal ground, the CC IN- terminal can be used for this purpose.*

Contact Closure loop (CCL) connection

The **CFO331/521/541** link provides one bi-directional contact closure channel line (CPT <--> CRR). The CCL input is a normal short circuit on/off - signal between connector's contact pins CC in+ and CC in- (= signal ground). The CCL output is a normal relay on/off - signal (24V / 1A) between connector's contact pins (CC out+ and CC out-). The connector in use is a **screw terminal** connector.

The CCL output channel can be alternatively configured for VSA (Video Source Alarm) usage with DIP switch. **The default factory setting is VSA off**.



The screw terminal connector and CCL connection.

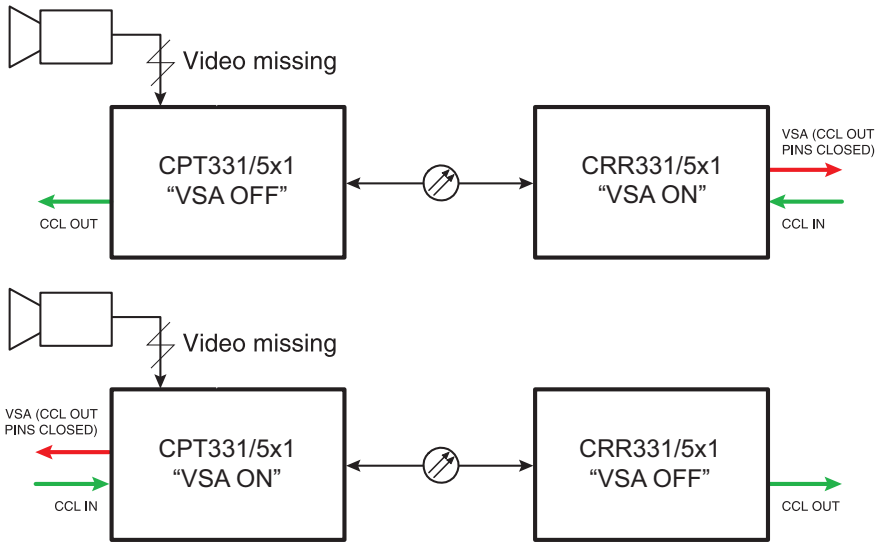
Pin	Description
CC in-	Contact closure input (ground)
CC in+	Contact closure input
CC out	Contact closure output (relay)
CC out	Contact closure output (relay)

Screw terminal connector's CC pinout.

Video Source Alarm (VSA)

The **CCL output** channel can be alternatively configured for Video Source Alarm (**VSA**) monitoring. Instead of normal CCL use, the CCL output can be used to provide a VSA signal if a loss of video signal occurs.
When VSA mode is enabled at **transmitter** and if video signal is missing (e.g. a camera malfunction, link otherwise operates normally), the CCL output pins are closed. Using VSA at just one end of the link enables the opposite path to be used for standard CCL operation (simplex). In case when VSA is enabled both at **transmitter** and **receiver**, the CCL channel is no longer available for any other use. When VSA is disabled the CCL channel is available for normal use in both directions. The VSA mode can be set on/off by the means of DIP switch (see previous page).

Note! *Video detection circuitry has 20 sec delay before VSA alarm is activated/inactivated.*



CCL and VSA connection examples.

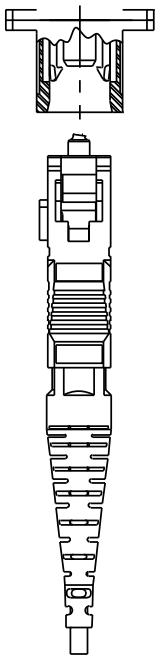
Link status indicator led

The **CPT331/521/541** contains LINK STATUS indicator led on the front panel which inform generic status of unit.

Colour	Status
Green	Optical signal level is adequate and synchronization on link level is achieved
Blinking Yellow/Green	Optical signal level is adequate, but no synchronization on link level is achieved
Yellow	Optical signal is missing or input level is too low

LINK STATUS indicator operation.

front view



The optical connector type is **SC/PC.**

Fibre connection

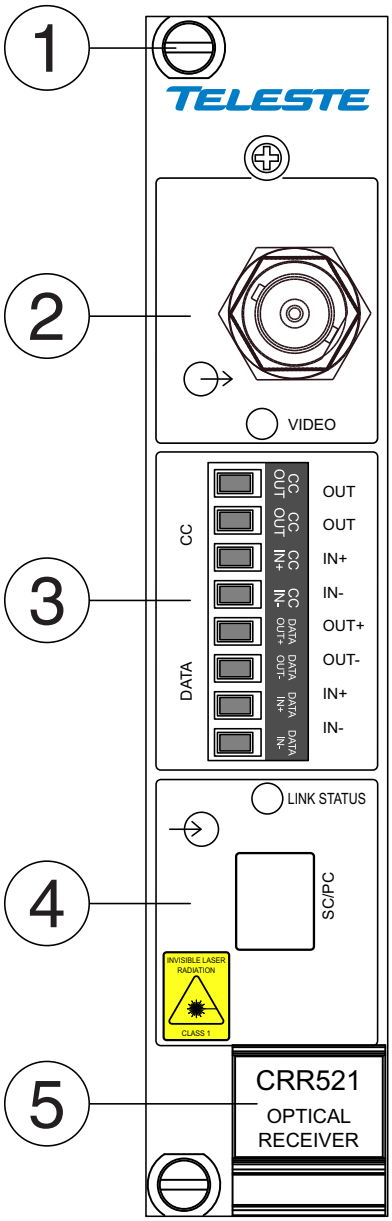
The optical connector is of the type **SC/PC**. The optical output level is constant and cannot be adjusted. For optical specifications please see page 11. When installing the fibre optic cable, do not exceed the minimum bending radius when connecting cable to the system.

Note! *For correct optical operation ensure that all optical connectors are cleaned immediately before mating. Connectors should always be cleaned using high purity alcohol (e.g. methyl or isopropyl alcohol). Dry the surfaces using clean compressed air or other equivalent pressurised gas. The optical connectors on the equipment should always be protected with dustcaps when there is no fibre inserted.*

Note! *Video, data and CCL outputs are disabled until optic link is properly established.*

Optical connection meets class **1M** laser safety requirements of IEC 60825-1: 2001 and US department of health services 21 CFR 1040.10 and 1040.11 (1990) when operated within the specified temperature, power supply and duty cycle ranges.

CRR - Single channel optical receiver



CRR331/521/541 Optical Receiver

1) Locking screw (2 pcs)
2) Video output (BNC female) and video indicator led
3) Data & CC connector (screw terminal, 10-pin)
4) Optical input/output (SC/PC) and link status indicator led
5) Handle (with unit information)

See further information on dedicated sections.

General

The **CRR331/521/541** is a one channel optical receiver for uni-directional video transmission with one bi-directional data and one contact closure channel. The current consumption is max. 250 mA (+12V DC).

Frame installation

The **CRR331/521/541** module is to be pushed along the guide rails into the installation frame (e.g. **CSR216** or **316** series) and secured with the two locking screws. The unit can be freely positioned in any slot in the frame. The empty positions in the frame should be blanked off with cover plates. The supply voltage is to be provided by a **CPS384** or **CPS390** power supply unit which are installed back of frame.

Stand-alone installation

The unit can be installed for stand-alone use by using a **CMA011** module adapter. The module should be mounted to a vertical surface. The +12 VDC supply voltage is supplied by the means of a separate mains adapter with a regulated output, (e.g. **CPS221**).

The permitted supply voltage range is 10.5...14 VDC. The current consumption is 250 mA. The permitted operational temperature range for CRR521 is from –10 to +70 °C and for CRR331/541 is from –34 to +74 °C.

Video connection and indicator led

The impedance of the video connection (BNC female) is 75 Ω.
The nominal input/output level is 1 Vpp. Video connection is equipped with the dual colour VIDEO led on the front panel. See table below for explanation of VIDEO indicator led's lights.

CSX Multiplexer operation

Alternatively the video channel can be used for **CSX** series multiplexer operation --> multiplexed audio/data/contact closure transmission.
No extra adjustments are needed.

Colour	Status
Green	Video signal is present, in nominal level,and the unit detects video sync pulses
Green*	A signal is present and in nominal level
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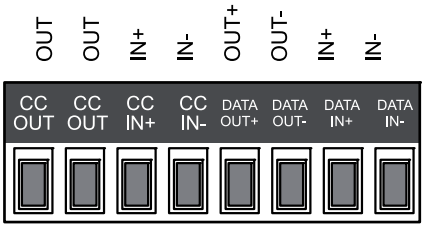
VIDEO indicator operation.

* When **CSX** series multiplexer operation is used.



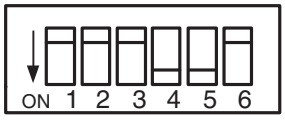
The screw terminal connector containing data and contact closure connections.

Data connection

The **CFO331/521/541** link provides one bi-directional data channel (CPT <--> CRR). The connector in use is a screw terminal connector. Available data modes for data channel are **RS232**, **RS422**, **RS485-2w** and **RS485-4w**. See table below how to connect the desired data mode. The desired data connection must be confirm by the means of DIP switches.

Pin	RS232	RS422	RS485-2w	RS485-4w
Data in-		in -	in / out -	in -
Data in+	in	in +	in / out +	in +
Data out-	out	out -		out -
Data out+		out +		out +

Screw terminal connector's data pinout.



CRR331/521/541 Data connection DIP switches (SW2).

Data contact	DIP switch position					
	1	2	3	4	5	6
RS232	off	off	off	off	off	
RS422				off	off	
RS485-2w				on	on	
RS485-4w				off	off	
- line bias		on	on			
- no line bias		off	off			
- term	on					
- no term	off					
VSA						on

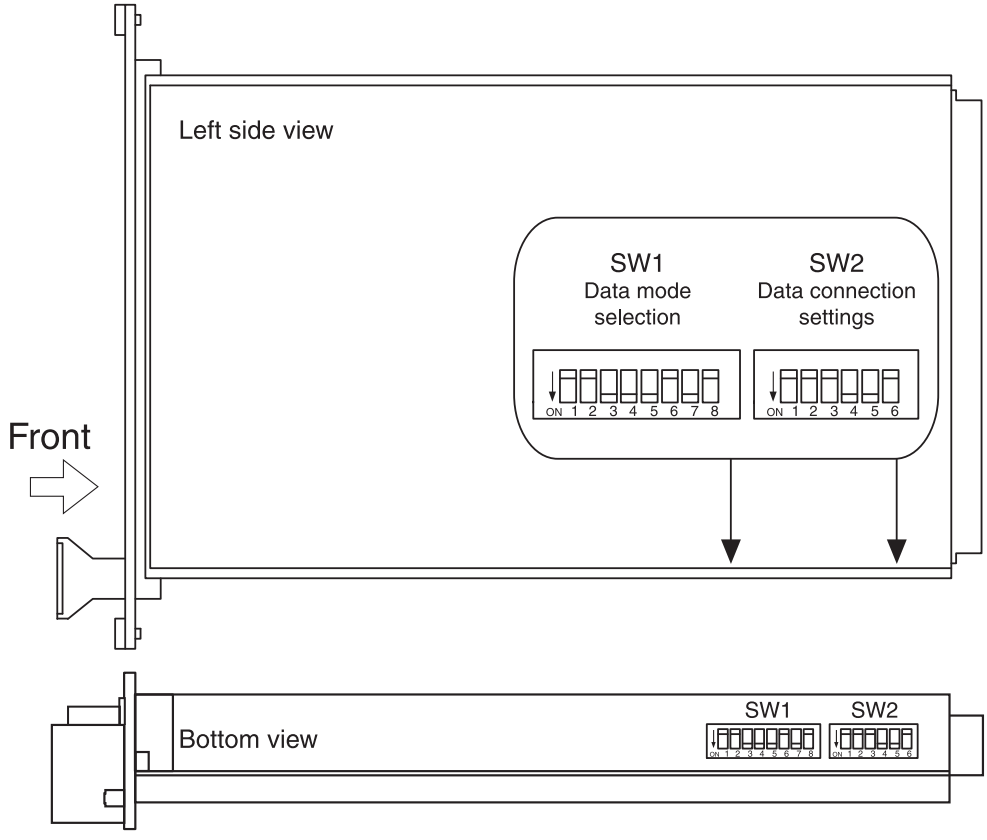
Data connection settings (SW2).

Note! *If data cabling is requiring signal ground, the CC IN- terminal can be used for this purpose.*

The desired data mode settings including dwelltime settings for **RS485-2w** can be set by the means of DIP switches. **The default factory setting is RS485-2w + dwelltime 75 µs, no line bias and no term.**

RS485-2w Dwelltime settings					Tx data		Rx data		Data channel mode
Dwelltime ms	Dip 1	Dip 2	Dip 3	Dip 4	Dip 5	Dip 6	Dip 7	Dip 8	
0,01	on	on	on	on	on	on	on	on	RS232
0,02	off	on	on	on	off	on	off	on	RS422
0,04	on	off	on	on	on	off	on	off	RS485-2w
0,075	off	off	on	on	off	off	off	off	RS485-4w
0,1	on	on	off	on					
0,2	off	on	off	on					
0,4	on	off	off	on					
0,6	off	off	off	on					
1	on	on	on	off					
1,2	off	on	on	off					
2	on	off	on	off					
3	off	off	on	off					
4	on	on	off	off					
6	off	on	off	off					
8	on	off	off	off					
10	off	off	off	off					

Data mode selection and RS485-2w dwelltime settings (SW1).

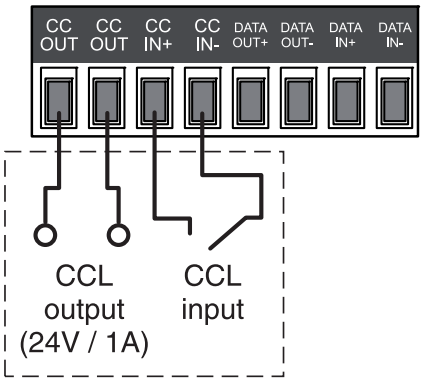


CRR331/521/541 DIP switches (SW1 & SW2).

Contact Closure loop (CCL) connection

The **CFO331/521/541** link provides one bi-directional contact closure channel line (CPT <--> CRR). The CCL input is a normal short circuit on/off - signal between connector's contact pins CC in+ and CC in- (= signal ground). The CCL output is a normal relay on/off - signal (24V / 1A) between connector's contact pins (CC out+ and CC out-). The connector in use is a **screw terminal** connector.

The CCL output channel can be alternatively configured for VSA (Video Source Alarm) usage with DIP switch. **The default factory setting is VSA off**.



The screw terminal connector and CCL connection.

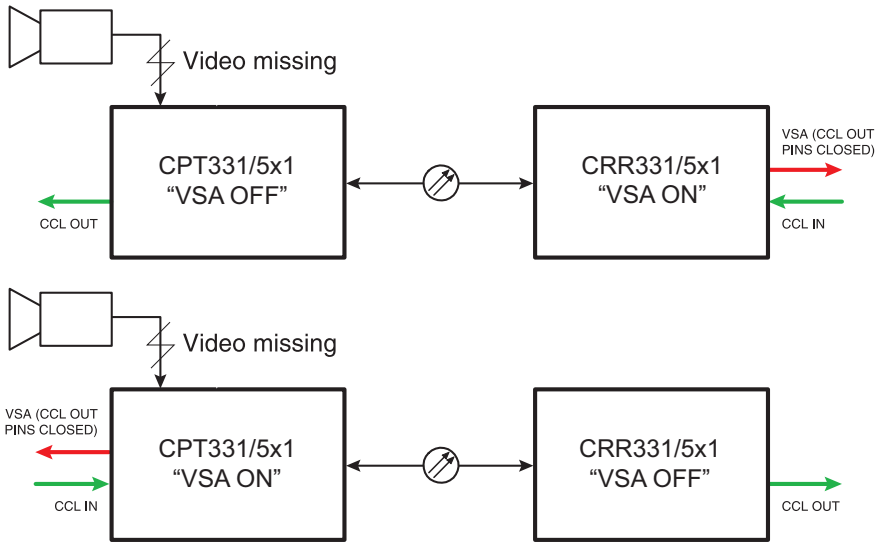
Pin	Description
CC in-	Contact closure input (ground)
CC in+	Contact closure input
CC out	Contact closure output (relay)
CC out	Contact closure output (relay)

Screw terminal connector's CC pinout.

Video Source Alarm (VSA)

The **CCL output** channel can be alternatively configured for Video Source Alarm (**VSA**) monitoring. Instead of normal CCL use, the CCL output can be used to provide a VSA signal if a loss of video signal occurs.
When VSA mode is enabled at **transmitter** and if video signal is missing (e.g. a camera malfunction, link otherwise operates normally), the CCL output pins are closed. Using VSA at just one end of the link enables the opposite path to be used for standard CCL operation (simplex). In case when VSA is enabled both at **transmitter** and **receiver**, the CCL channel is no longer available for any other use. When VSA is disabled the CCL channel is available for normal use in both directions. The VSA mode can be set on/off by the means of DIP switch (see previous page).

Note! *Video detection circuitry has 20 sec delay before VSA alarm is activated/inactivated.*



CCL and VSA connection examples.

Link status indicator led

The **CRR331/521/541** contains LINK STATUS indicator led on the front panel which inform generic status of unit.

Colour	Status
Green	Optical signal level is adequate and synchronization on link level is achieved
Blinking Yellow/Green	Optical signal level is adequate, but no synchronization on link level is achieved
Yellow	Optical signal is missing or input level is too low

LINK STATUS indicator operation.

Alarm connection

Alarm at the rear connector of the unit is low open collector output, with the capability of 30 V/10 mA switching.

Alarm	Description	Reason
B	Link status alarm	No synchronization achieved at optical input.

Open collector alarms.

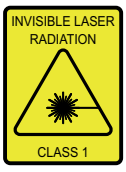
Fibre connection

The optical connector is of the type **SC/PC**. The optical output level is constant and cannot be adjusted. For optical specifications please see page 11. When installing the fibre optic cable, do not exceed the minimum bending radius when connecting cable to the system.

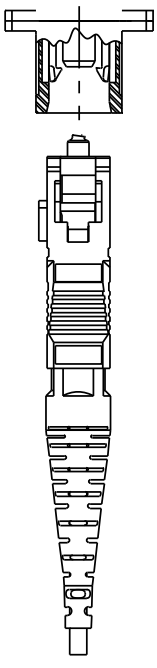
Note! *For correct optical operation ensure that all optical connectors are cleaned immediately before mating. Connectors should always be cleaned using high purity alcohol (e.g. methyl or isopropyl alcohol). Dry the surfaces using clean compressed air or other equivalent pressurised gas. The optical connectors on the equipment should always be protected with dustcaps when there is no fibre inserted.*

Note! *Video, data and CCL outputs are disabled until optic link is properly established.*

Optical connection meets class **1M** laser safety requirements of IEC 60825-1: 2001 and US department of health services 21 CFR 1040.10 and 1040.11 (1990) when operated within the specified temperature, power supply and duty cycle ranges.



front view



The optical connector type is **SC/PC.**

Technical Specifications

Optical, forward		
Output wavelength	1310 nm	typical, +/- 50 nm
Output power	-15...-8 dBm	CFO331
Input sensitivity	-28 dBm, min	CFO331
Output power	-14...-8 dBm	CFO521
Input sensitivity	-31 dBm, min	CFO521
Output power	-5...0 dBm	CFO541
Input sensitivity	-33 dBm, min	CFO541
Bit rate	202.5 Mbps	
Optical connector type	SC/PC	

Optical, return		
Output wavelength	1550 nm, typical, +/-30 nm	CFO331/521
Output wavelength	1550 nm, typical, +/-50 nm	CFO541
Output power	-15...-8 dBm	CFO331
Input sensitivity	-28 dBm, min	CFO331
Output power	-14...-8 dBm	CFO521
Input sensitivity	-31 dBm, min	CFO521
Output power	-15...-8 dBm	CFO541
Input sensitivity	-33 dBm, min	CFO541
Bit rate	20.25 Mbps	CFO331
Bit rate	40.5 Mbps	CFO5x1
Optical connector type	SC/PC	

Video		
Number of channels	1	uni-directional
Standard	PAL/NTSC	CVBS
Input level	1 Vpp	
Input overload level	1.75 Vpp	
Impedance	75 ohm	
Sampling resolution	10 bit	
Sampling rate	13.5 MHz	
Bandwidth	5.5 MHz	-1 dB
Insertion gain	+/-1 dB	
C/L gain inequality	4 %	
C/L delay inequality	40 ns	
Differential gain	2 %	
Differential phase	1°	
SNR	67 dB	weighted
Video connector	BNC female	

Data		
Number of channels	1	bi-directional
Data format	RS232/422/485	selectable
Data rate	0...230 kbps	
Sampling rate	16 MHz	
Data connector	Screw terminal	

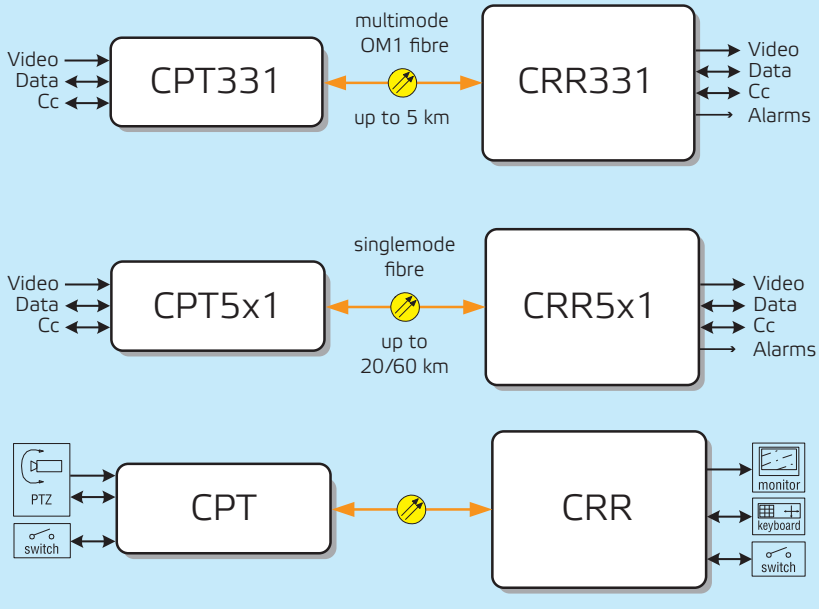
Contact Closure		
Number of channels	1	bi-directional
Input	dry contact	
Output	24V / 1A (relay)	max
Switching frequency	5 Hz	
Contact closure connector	Screw terminal	

Alarms		
Video	CC output	configurable
Optical input signal	B alarm	CRR

General		
Supply voltage	10.5...14 VDC	regulated
	16...28 VAC	CPT
Supply voltage connector	screw terminal	CPT
Current consumption	250 mA	max
Dimensions (H x W x D)		
CRR	3U • 5HP • 190 mm	without CMA
CPT	35 • 48 • 62 mm	without connectors
Weight	0.2 kg	CPT
	0.5 kg	CRR
Video & link status	LED displays	
Operating temperature	-10...+70 °C	CFO521
	-34...+74 °C	CFO331/541
Storage temperature	-40...+80 °C	recommended
Humidity	0...95 %	non condensing
EMC compatibility	EN61000-6-3, EN50130-4, CE	

Notes	
Class 1 Laser Product	CFO521
Class 1M Laser Product	CFO331/541

Typical values unless otherwise stated



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WEEE directive

Directive 2002/96/EC of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE) obliges that producers appropriately mark electrical and electronic equipment with the symbol indicating separate collection. This obligation applies to the equipment put on the market in EU after 13 August 2005.

Teleste devices which belong to the scope of the directive have been marked with the separate collection symbol shown below. The marking is according to the standard EN 50419. The symbol indicates that the device has to be collected and treated separately from unsorted municipal waste.

User manual revision history note:
The latest version is always available in pdf-format on our web site:
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