

**Televes®**



T.OXK SERIES

EN TWIN QPSK - PAL CI

Ref. 553701

User manual



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## 1. Technical specifications

### 1.1. TWIN QPSK-PAL CI ref. 553701

QPSK Demodulator	LNB Powering (1 unit):	13/17V== (±0.5 V) / OFF 22KHz (±2KHz) (Select. ON/OFF)	Input VSWR (75 ohm):	> 7 dB (950 - 2150 MHz)
	Input through losses:	< 1.5 dB (950-2150 MHz)	Input symbol rate:	2 - 42,5 Mbaud
	Input frequency:	950 - 2150 MHz	Capture range:	± 960 ppm
	Frequency steps:	1 MHz	Roll-off factor:	35%
	Locking margin:	± 1 MHz (<5 Mbaud) ± 2 MHz (5-10 Mbaud) ± 5 MHz (>10 Mbaud)	Convolutional code:	1/2, 2/3, 3/4, 5/6, 7/8
			Descrambling:	ETS300421
			Deinterleaving:	ETS300241
Input level:	44 to 84 dBµV (-65 to -25 dBm)	Block code:	RS(204,188)	
MPEG-2 Video decoders	Input 1 format:	MPEG-1	Chrominance format:	4:2:0
	Decoding:	ISO/IEC 11172-2	Video resolution:	Max. 720 x 576
	Input 2 format:	MPEG-2	WSS signalling:	Active
	Decoding:	ISO/IEC 13818-2 (MP@ML)	Subtitle insertion PAL:	Active
	TS input rate:	Max. 90 Mbits/seg	Base band video output:	Jack 2,5 mm.
	Video rate:	1.5 to 15 Mbits/seg		
MPEG-2 Audio decoders	Input format:	MPEG-1, MPEG-2	Audio output:	Stereo, Dual
	Decoding:	LAYER 1, LAYER 2		
RF output	Output frequency:	46- 862 MHz	VSWR Output (75 ohm):	10 dB min. 14 dB typ.
	Frequency steps:	250 KHz	Through losses:	< 1.5 dB (46-862 MHz)
	Maximum output level:	80 ±5 dBµV	Spurious band level:	55 dBc min. >60 dBc typ.
	Attenuation:	>15 dB		
General	Consumption (with signal)*:	24V==: 550 mA typ. (no CAM inserted; LNB power OFF)		
		24V==: 590 mA typ. (CAM inserted; LNB power OFF)		
24V==: 755 mA typ. (no CAM inserted; LNB power ON)				
24V==: 810 mA typ. (CAM inserted; LNB power ON)				
	Index of protection:	IP20		

\*The unit's consumption with CAM will depend on the type of CAM being used. For the LNB it is considered a standard consumption of 300 mA.  
The technical characteristics described are defined for a maximum ambient temperature of 45°C (113°F). Forced ventilation is used for higher temperatures.

1.2. Technical specs. Broadband Amplifiers

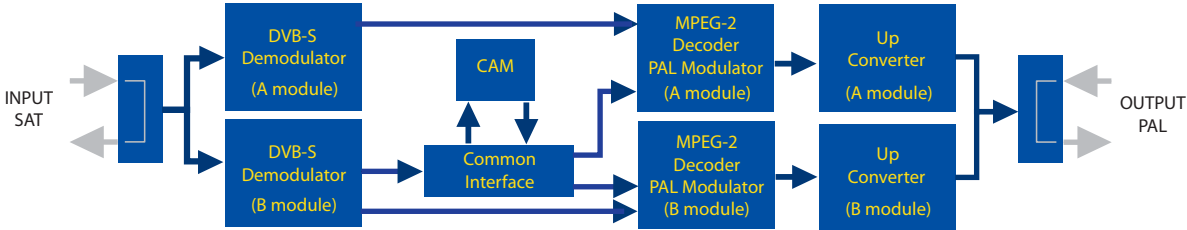
Amplifier 5575	Frequency range:	46 ... 862 MHz	Connector:	"F"
	Gain:	44 ± 2,5 dB	Power supply:	24 V===
	Regulation margin:	20 dB	Consumption at 24 V===:	450 mA
	Output level (60 dB):	105 dBμV (42 CH CENELEC)	Test socket:	-30 dB
Amplifier 451202	Frequency range <sup>(1)</sup> :	47 ... 862 MHz	Connector:	"F"
	Gain <sup>(1)</sup> :	40 - 53 dB (selec.)	Power supply:	196 - 264 V~ 50/60 Hz
	Maximum output level <sup>(1)</sup> :	129 dBμV (typ.) (DIN 45004B)	Max. Power:	16 W
	Frequency range <sup>(2)</sup> :	5 ... 30 MHz	Test socket:	-20 dB
	Gain <sup>(2)</sup> :	20/ -3 dB (typ.)		
	Maximum output level <sup>(2)</sup> :	129/ --- dBμV (typ.) (DIN 45004B)		

(1) Main channel      (2) Return channel (active/passive)

1.3. Technical specs. Power Supply Unit

Power supply unit 5629	Mains voltage:	196 - 264 V~ 50/60 Hz	Total max. current (outpur 1 + output 2):	5A    (24V===)
	Output voltage:	24V===	Max. current per output:	4A    (24V===)

1.4. Blocks Diagram

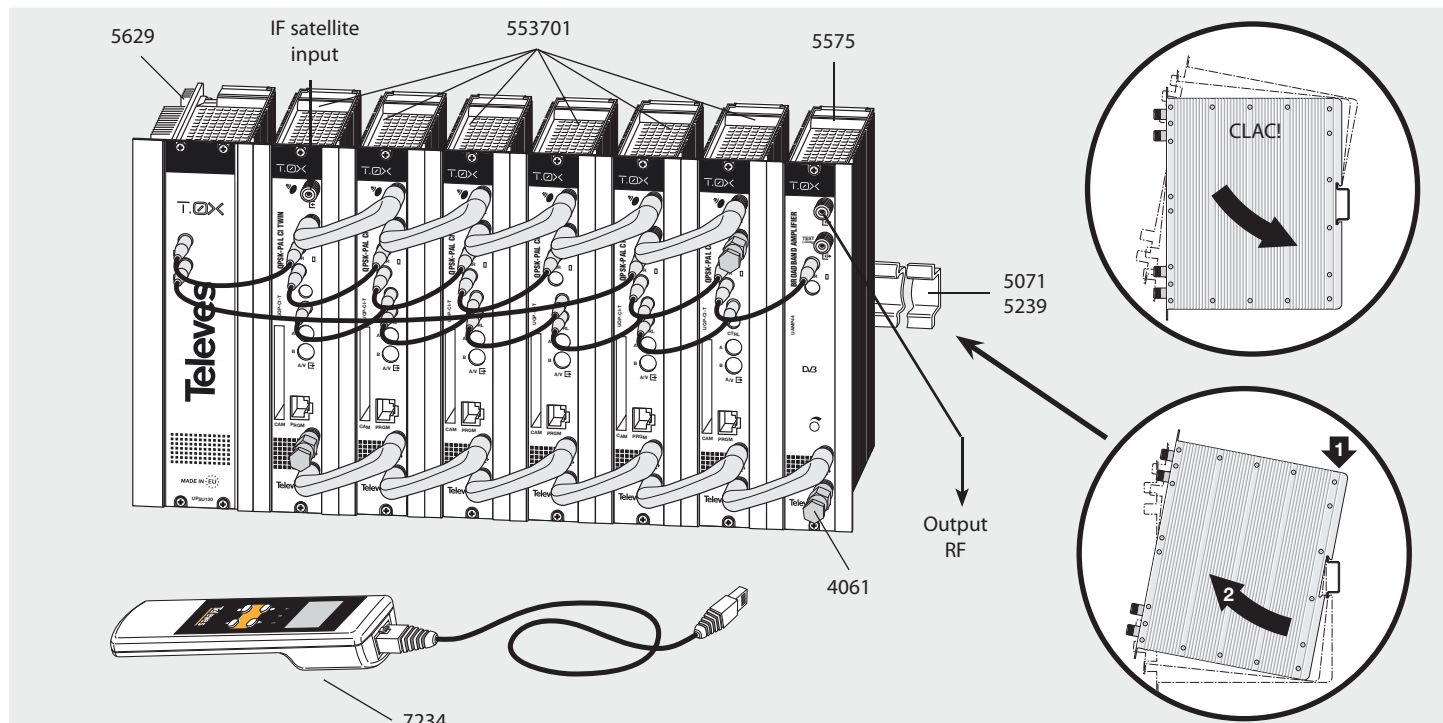


## 2. Description of references

Product Range		Accessories	
553701	T-0X TWIN QPSK-PAL CI	7234	Universal Programmer
5575	Broadband Amplifier 44dB 120dBμV T-0X	5071	T03-T05-T-0X Mounting rail (50 cm)
451202	Amplifier DTKom (47 - 862 MHz)	5239	T03-T05-T-0X Mounting rail.12 Modules+PSU (56 cm)
5559	Headend Manager CDC-IP T-0X	5301	19" Subrack frame
555901	Headend Manager CDC-IP GSM T-0X	507202	T-0X Lockable cabinet with Ventilation Unit (7 Modules + PSU)
5629	Power supply unit 24VDC/5A T-0X	4061	75 Ohm DC-Block load
		4058	75 Ohm Load
		422601	T05 to T-0X Power connection lead (40 cm)
		422602	T05 to T-0X Management connection lead (40 cm)
		422603	T-0X Management connection lead (1m)
		5673	Blank plate 50 mm

## 3. Mounting

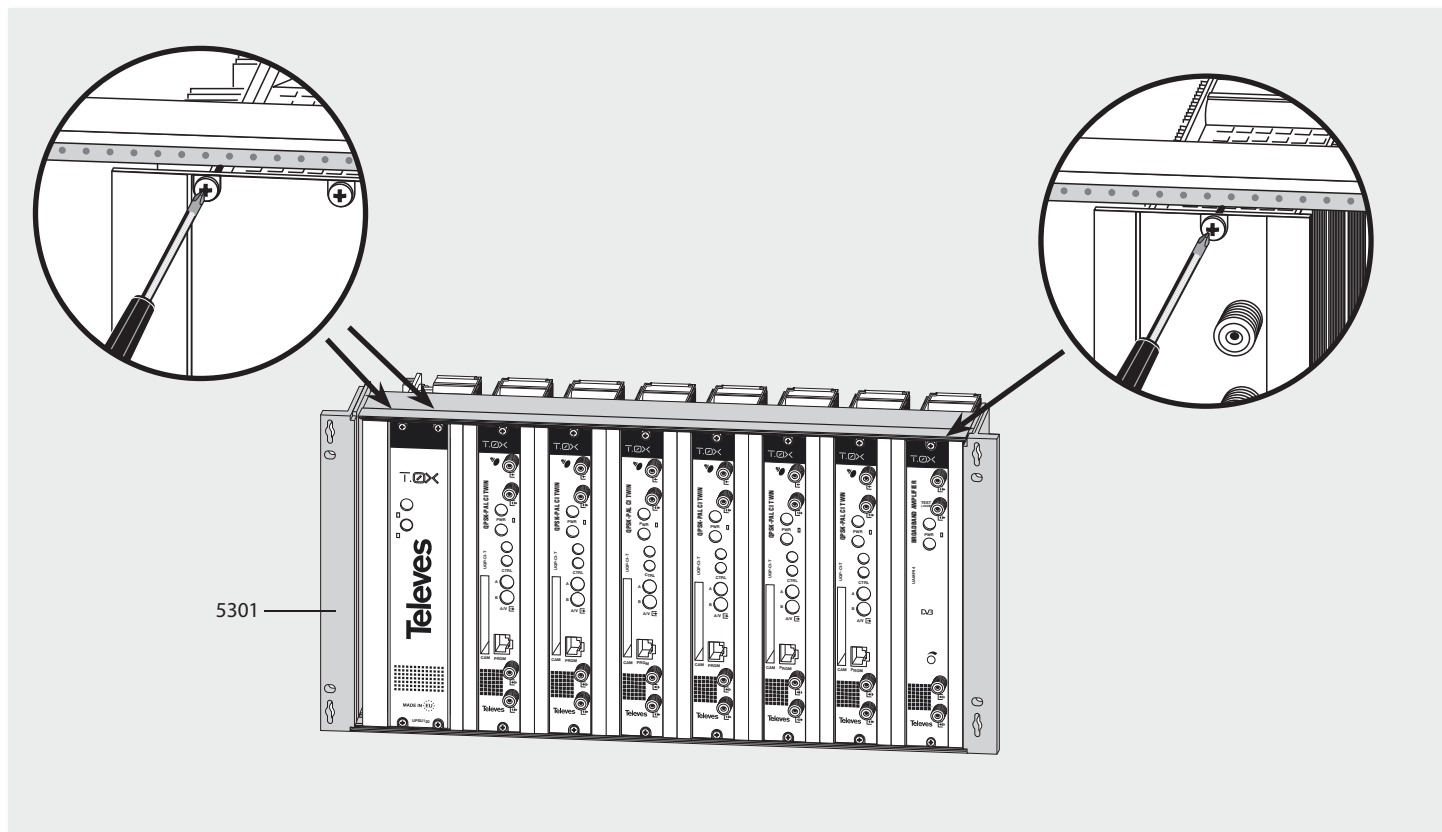
### 3.1. Wall mounting



**NOTE:** The use of both PSU power outputs is recommended to balance the consumption. For example, 4+3 or 3+4



### 3.2. 19" rack mounting



## 4. Elements description

### 4.1. Introduction

The TWIN QPSK-PAL CI unit allows the user to transmodulate two channels (TV or radio) selected from those in two satellite transponders in the same band and polarisation, into two VHF/UHF PAL channels, with the possibility of stereo modulation.

To do this, the unit demodulates the two QPSK input channels (transponders) to obtain the MPEG-2 TS signal (Transport Stream MPEG-2) for each of the input channels to carry out the subsequent modulation of both audio and video signals of the selected program, to any channel or frequency between 46 and 862MHz.


The unit allows access to scrambled services by using a conditional access module (CAM) that performs the service's descrambling.

#### **Descrambling is only allowed for the module B.**

The selection of parameters (input frequency, SR, output level, output frequency, ...) is performed by using the programmer ref. 7234, which is plugged in its own socket on the front of the unit.

It is also possible to control the unit from a PC as described in Section 6.

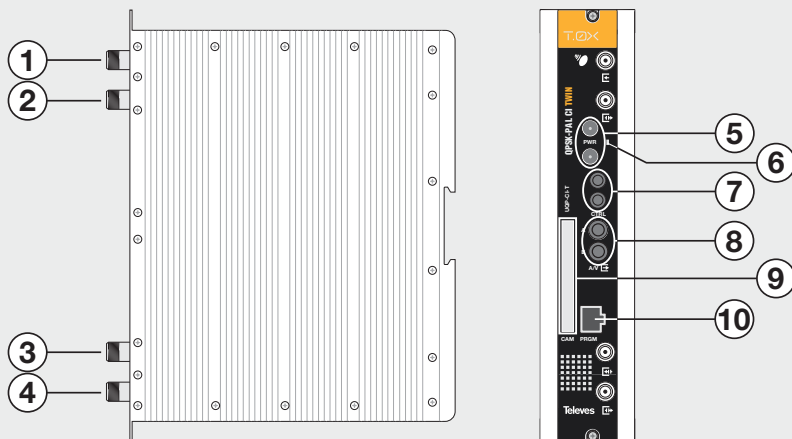
The normal operation of modules is as follows:

- **Module A:** All changes are made and/or previewed in real time, except for some cases to be discussed in the corresponding section.
- **Module B:** To make and/or preview changes in real time, you have to save them (long press on key  key), except for some cases to be discussed in the corresponding section.

The TWIN QPSK-PAL CI unit features:

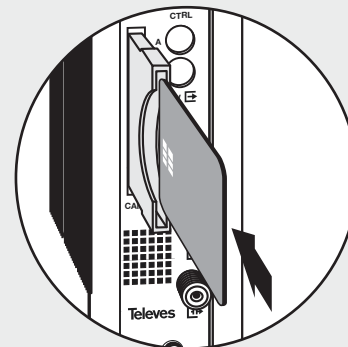
- An IF loop-through for the input connectors on the top of its front, in order to enable the passage of the input signal to other modules. On the other hand, allows current by-pass through the IF input cable (13 or 17 Vdc) to power the LNB as well as to generate and send out a 22KHz tone through this input to select the LNB oscillator.
- A RF loop-through for the output connectors on the bottom of its front, in order to mix the channels for further amplification.
- A slot for inserting a conditional access module (CAM) for the module B of the TWIN unit.
- Two 2.5 mm jack connectors used to connect the headend controller CDC T-0X via a control BUS.
- Two 3.5 mm jack connectors that make available in baseband the two audio & video channels of each module.

## 4.2. TWIN QPSK-PAL CI



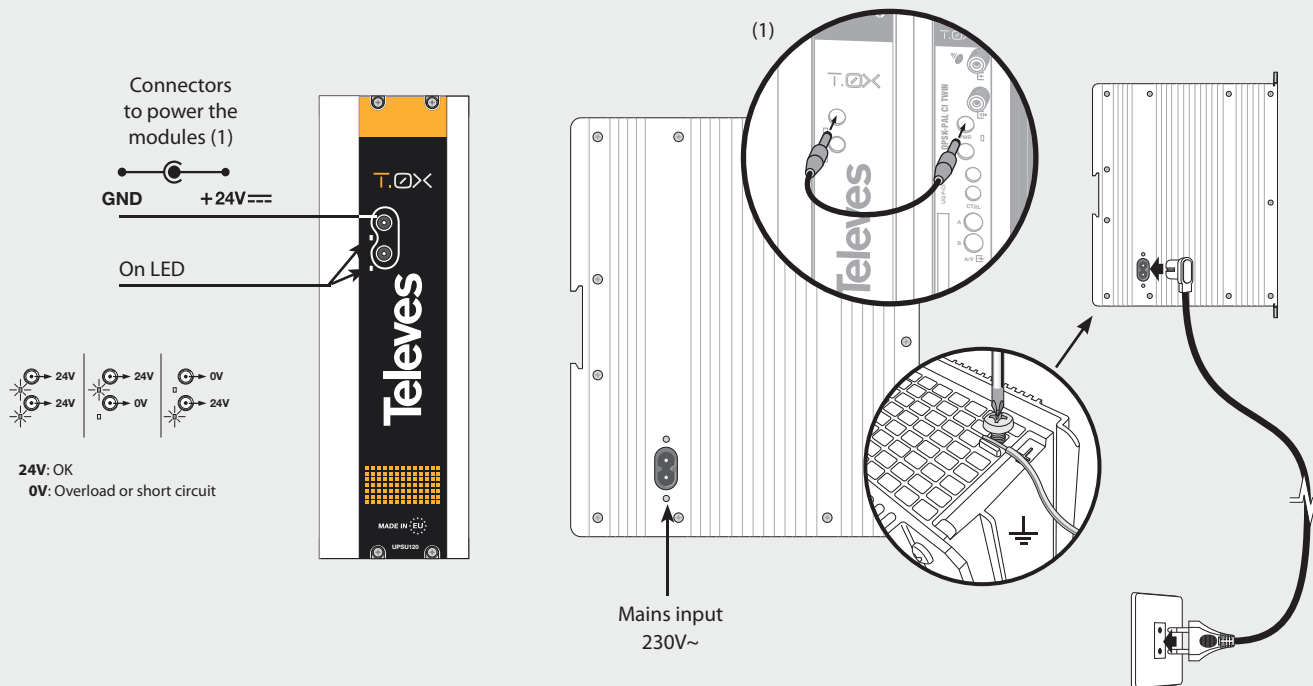
- 1. IF satellite input
- 2. IF satellite output
- 3. RF input
- 4. RF output
- 5. Powering BUS connectors

- 6. Status LED
- 7. Control BUS connectors
- 8. Baseband audio/video outputs
- 9. Slot to insert the CAM
- 10. Programmer/PC socket



Insert the smartcard completely into the CAM slot. Card contacts looking left and forwards.

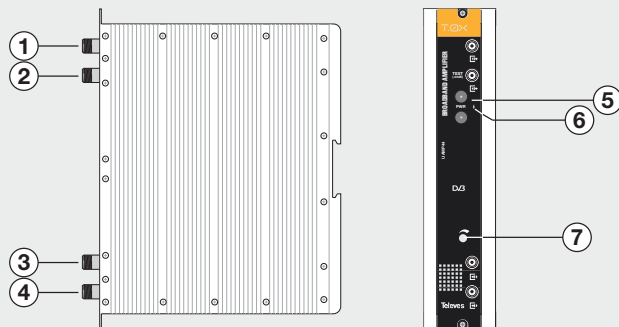
### 4.3. Power supply unit



- NOTES:**
- The PSU can power up to **6** modules with CAM plus **an** extra module with CAM powering a LNB.
  - Whenever the demand of power exceeds 4A (max. current for each output), it is necessary to distribute it between the two powering outputs of the PSU.

## 4.4. Broadband amplifier

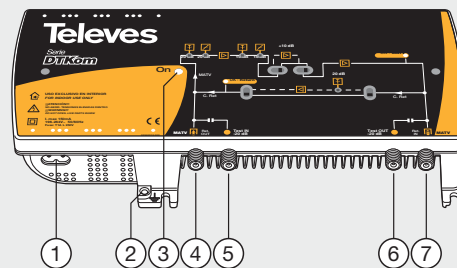
### OPTION "A" - 5575



- |                         |                            |
|-------------------------|----------------------------|
| 1. RF output            | 5. Powering BUS connectors |
| 2. Test socket (-30 dB) | 6. Status LED              |
| 3. RF input             | 7. Gain attenuator         |
| 4. RF input             |                            |

It features two input connectors, to allow mixing of channels coming out from two different systems. If only one of the inputs is used, it is recommended to load the unused input with a 75 ohm terminator, ref 4061. As the rest of T-OX units, this amplifier is powered via the 24 Vdc power BUS.

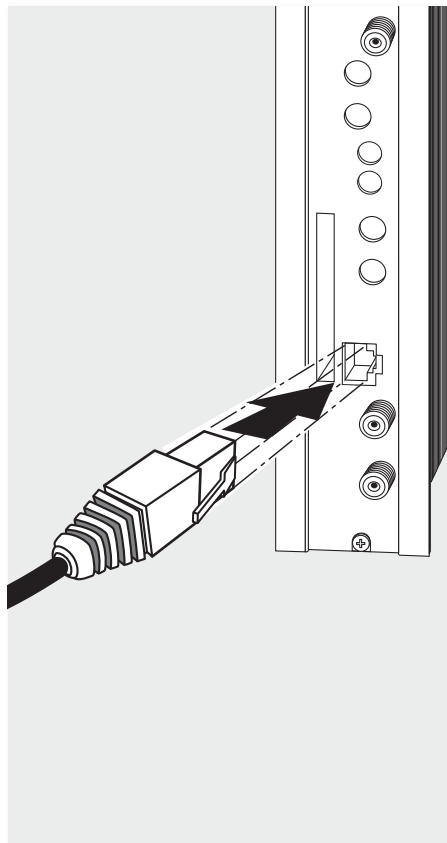
### OPTION "B" - 451202



- |   |
|---|
| 1. Mains power supply input (196-264 V~ 50/60 Hz) |
| 2. Ground connection                              |
| 3. Power LED                                      |
| 4. MATV input                                     |
| Return channel output                             |
| 5. MATV input test                                |
| 6. MATV output test                               |
| 7. MATV output                                    |
| Return channel input                              |

Input signals through connectors 3 & 4 are combined and amplified in the frequency band 47-862 MHz

## 4.5. Universal Programmer



The programmer features 4 buttons:

- (short press) - Selection of parameter (positioning of the cursor).
- ▲-▼ Modification of the parameter chosen by the cursor (flashing)
- (short press) - Change menu
- (long press) - Change between Principal and Extended menus
- (long press) - Save changes to memory
- +▲ Cloning menu.
- +●+▲ Increases the contrast of the screen.
- +●+▼ Decreases the contrast of the screen.

## 5. - Instructions for use

Connect the controller to the front socket of the module QPSK-PAL CI ("PRGM"). At first, the controller's firmware version will appear:

```
PCT firmware
version
-----
V.5.03
```

Next, the firmware version of the QPSK-PAL CI TWIN module is shown:

```
Unit
firmware
version:
V:3.21
```

### 5.1. Main Menu

To switch between **A** and **B** modules of the TWIN unit, keep pressed the key ● until the A/B indication stars to flash in the upper left corner of the display. Then use keys ▲ and ▼ to select de desired module.

Within **B** module, changes of parameters are updated after saving. Only changes in level are updated instantly.

Within **A** module, all changes of parameters are updated instantly. Cloning functions are available by pressing keys ● and ▲.

These functions allow copying the TWIN QPSK-PAL unit configuration into the programmer and then download it to another TWIN QPSK-PAL unit.

Please refer to Universal Programmer's leaflet to check all these cloning functions.

#### a. Output Menu

After selecting one of the A or B modules, the first menu shows **output frequency/channel** (depending on the operation mode) and **output level** submenus.

```
A►OUTPUT
Frequency:
471.25 MHz
Level: 00
```

The frequency ranges from 46 to 862 MHz.

The output level can be modified from 99 down to 00, and set to OFF.

- Set 99 to obtain the max. oputput level.
- All the way down to the value 00, the output level is attenuated 15 dB.
- Select OFF to switch-off the output. Whenever being in module A of the unit, save to set the OFF selection

To modify the frequency, press ● until the cursor shifts over the desired digit. Then change its value using keys ▲ and ▼. Regarding decimal part of the frequency, select a value out of the following four ones:

```
=> .00 MHz
=> .25 MHz
=> .50 MHz
=> .75 MHz
```

To modify the output channel and its level, press ● until the cursor shifts over the desired digit. Then change its value using keys ▲ and ▼.

Whenever being in module B, it is not necessary to save to set the change.

```
A►OUTPUT
Channel: 21
<471.25 MHz>
Level: 99
```

To switch between frequency mode and channel mode, consult *EXTENDED MENU* in paragraph 5.2.

## b. Input Menu

The next menu allows selection of the following:

- Input frequency (950-2150 MHz)
- QPSK input baud rate (2-42.5 Mbaud)
- LNB powering (0, 13, 17 Vdc; 22 KHz tone)

To modify the frequency, press ● until the cursor shifts over the desired digit. Then change its value using keys ▲ and ▼.

Whenever being in module A of the unit, save to set changes.

```
A▶INPUT
Freq:1451MHz
Baud:27.500
LNB:13V22kHz
```

In case of an input connector short-circuit condition (LNB powering option activated), the front LED of the TWIN unit will flash until this condition disappears.

Programmer's LEDs status have a correspondance with the colour of the LED situated in the front of the TWIN QPSK-PAL unit.

- LED glows GREEN indicating that both A and B modules of the TWIN unit are working fine.
- LED glows RED indicating that something has happened in one of the modules (A or B) inside the TWIN QPSK-PAL unit.

If the output of one of the two modules (A or B) inside the TWIN unit is switched-OFF, its state will not be displayed on the frontal LED of the unit.

## c. Service Menu

This menu displays the name of the service selected together with the number of services available in the multiplex:

```
A▶SERVICE
1/5
TUE 1
```

Pressing the ▲ and ▼ keys changes the service selected.

## d. Audio Menu

There are two modes of operation for selecting the audio service: language and index (see point 5.2.b "Audio mode menu" in EXTENDED MENU).

In **audio language mode**, the two preferred audio languages can be chosen. The unit will search for the audio corresponding to the first selected language. If it cannot be found, the unit will then search for audio corresponding to the second selected language.

If neither of the two languages is found, the unit will select the first audio channel of the program.

In this mode of operation, the unit searches for audio corresponding to the desired language, even if that language is broadcasted on one of the dual audio service channels.

```
A▶AUDIO
Audio 1: fin
Audio 2: den
Stereo
```

List of available languages to be selected:



'eng'	English
'fra'	French
'den'	Danish
'nor'	Norwegian
'spa'	Spanish
'ger'	German
'swe'	Swedish
'fin'	Finnish
'ita'	Italian
'dut'	Dutch
'por'	Portuguese
'pol'	Polish
'rus'	Russian
'mdr'	Chinese
'hun'	Hungarian
'jpn'	Japanese
'lit'	Lithuanian
'est'	Estonian
'ara'	Arabic
'scc'	Serbian (Latin 1)
'cro'	Croatian
'ukr'	Ukrainian
'slo'	Slovakian
'bel'	Belarusian
'tur'	Turkish
'chi'	Chinese
'cze'	Czech
'rum'	Rumanian
'gre'	Greek
'lav'	Latvian
'kor'	Korean
'srp'	Serbian (Cyrillic 1)
'bul'	Bulgarian
'heb'	Hebrew
'che'	Chechen
'mol'	Moldavian
'slv'	Slovenian
'tlh'	Klingon

**NOTE:** Sometimes it is not broadcasted the identity of the audio language (e.g. it is sent "----" instead of "eng"), in which case the receiver is not able to recognize the selected language. In these situations it is recommended to use the index mode to select the audio language.

In the **audio index mode**, the user selects the audio service from a list of audios available for the current program:

\*\*\*\*\*

Once within the audio subcarries menu, there are the following options:

1. Audio Language Mode:
  - Stereo
  - Automatic Stereo, Automatic
2. Audio Index Mode: Stereo
  - Dual
  - Left (L)
  - Right (R)
  - Automatic.

#### - Audio Language Mode:

In stereo mode, (L+R)/2 is modulated by 5.5 MHz and R by 5.74 MHz. Signalling will always be stereo.

A▶AUDIO  
Audio 1: fin  
Audio 2: den  
Stereo

In automatic mode, both signalling and modulated signals depend on the indication obtained from the demodulated audio stream.

A▶AUDIO  
Audio: 01/02  
Audio mode:  
Automatic.

If the audio stream indicates **stereo**, then (L+R)/2 is modulated by 5.5 MHz and R by 5.74 MHz, and signalling is stereo.

Whereas if the stream indication is **dual**, then L is modulated by 5.5 MHz and R by 5.74 MHz, and signalling is dual.

#### - Audio Index Mode:

In stereo mode, (L+R)/2 is modulated by 5.5 MHz and R by 5.74 MHz. Signalling will always be stereo.

```

A▶AUDIO
Audio: 01/02
Audio mode:
Stereo

```

In dual mode, L will be modulated by 5.5 MHz and R by 5.74 MHz. Signalling will always be DUAL.

```

A▶AUDIO
Audio: 01/02
Audio mode:
Dual

```

In left mode, L will be modulated by both carriers and signalling will always be mono.

```

A▶AUDIO
Audio: 01/02
Audio mode:
Left

```

In right mode, R will be modulated by both carriers and signalling will always be mono.

```

A▶AUDIO
Audio: 01/02
Audio mode:
Right

```

\*\*\*\*\*

If an option other than 5.5 MHz is selected from the audio subcarrier's menu, then the signalling is always mono, and the following options will be displayed:

#### - Audio Language Mode:

```

A▶AUDIO
Audio 1: fin
Audio 2: den

```

No selectable options

#### - Audio Index Mode:

(L+R)/2 will be modulated by the corresponding audio sub-carrier.

```

A▶AUDIO
Audio: 01/02
Audio mode:
R+L

```

R will be modulated by the audio sub-carrier.

```

A▶AUDIO
Audio: 01/02
Audio mode:
Right

```

L will be modulated by the audio sub-carrier.

```

A▶AUDIO
Audio: 01/02
Audio mode:
Left

```

**Note:** If the audio service is dual (one language in L channel and another in R channel), then the user must select the most suitable option (Right or Left). If R+L is selected, then both languages will be output simultaneously.

To make a change, press ● until the desired parameter flashes. This field can then be modified using keys ▲ and ▼.

## e. Measurements Menu

This menu displays an **estimated value of the BER** (Bit Error Rate before Viterbi decoding).

A►MONITOR  
CBER: 2.4E-3

## f. Temperature Menu

This menu indicates the **current temperature** on a scale of 1 to 10, as well as the maximum recorded along its working time. Pressing the ● key resets this maximum, i.e. the maximum value is updated to the current value.

►TEMPERATURE  
Now: 04  
Max: 06  
●reset

The recommended operational margins are as follows:

**Optimum Operation: 0-6**

**High Temperature: 7-8**

**Excessive Temperature: 9-10**

If the maximum recorded temperature is outside the optimum margin, the installation should be checked to maintain the temperature within its optimum limits.

In order to check if this change has been effective, the maximum value recorded can be reset and its value checked after a certain elapsed time.

## 5.2. Extended Menu

When the ● key is held down for more than 3 seconds the unit displays a series of less frequently used menus, called *extended menus*.

### a. Subtitles Menu

The unit allows subtitling, both with **DVB subtitles** as well as **teletext**.

Two preferred languages may be chosen for the subtitles, so that if the first language isn't found, then the second one is chosen. It is also possible to deactivate subtitling. A second language can only be selected for the subtitles if a first language has been activated.

The selected language has priority over the subtitle type.

A►SUBTITLES  
Subt1: fin  
Subt2: ---  
Ttx subt: aut

If the service does not automatically show the subtitles, the teletext page number should be entered where available.

Subtitling options are as follows:

- **Subt. OFF:** All subtitles deactivated.
- **Ttx. Subt: aut:** Teletext subtitles only (automatic or page selected by user).
- **DVB subt.:** DVB subtitles only
- **DVB+Ttx:** DVB and teletext subtitles (*priority for DVB*).

#### Ttx.Subt options

- **"aut"** mode: The unit automatically searches for the teletext page of the selected language.
- Selection of a fixed teletext page for subtitling (normally page 888).

This page is only displayed if the unit cannot find teletext subtitles for the languages selected previously.

The list of available languages is the same audio list shown on paragraph d of the Main Menu.

### b. Audio Mode Menu

This menu allows the selection of the manner in which the unit handles a program's **audio**. There are two options: language and index.

- **Language:** two preferred audio languages can be chosen. The unit will automatically search for the corresponding language.

A►AUDIO MODE

language

- **Index:** the audio is selected from the audio channels available for the current program. This option may be used if the audio information is not transmitted correctly.

A►AUDIO MODE

Index

### c. Modulator 1 Menu

This menu displays the following output modulation parameters:

- Video-to-Audio carrier's ratio
- Two values for choice: -12 and -16 dB
- Video-to-Audio carrier's spacing in MHz

A►MODULATOR►  
PictS:-12  
Sound:5.5MHz

Select one out of the following values: 4.5, 5.5, 6.0 & 6.5 MHz. When 5.5 MHz is selected, the output is stereo and two audio subcarriers are generated.

For the rest of configurations, the output is monoaural and only a single audio subcarrier is generated.

To perform these choices, press ● until the desired parameter start to flash. Then change its value using keys ▲ and ▼.

## d. Modulator 2 Menu

Once opened this menu, it displays:

- Audio level
- Audio subcarrier-to-Video carrier ratio
- Video format.

```

A►MODULATOR
S.Dev: 5
PictS 2:-20
Letterbox
  
```

**Audio level:** the value displayed indicates the audio input level necessary to obtain a  $\pm 50$  KHz deviation as long as there is an input signal of 1 KHz. This means that 13 provides a higher audio level than 00.

Input level
00
01
02
03
04
05
06
07
08
09
10
11
12
13

**Audio sub-carrier to video carrier ratio:** allows selection of audio sub-carrier level relative to video carrier; possible values are:

- 18dB      -22dB.
- 20dB      -24dB.

**Video format:** allows video mode to be selected for transmissions in 16:9 format. There are three possible options:

- Pan & Scan: The image is centred and cut each side.
- Letterbox: The full image is displayed with black bars added in the upper and lower parts.
- Full Screen: The image is adapted for the entire screen but is deformed.

To make a change, press ● until the desired parameter flashes. This field can then be modified using keys ▲ and ▼.

## e. Configuration Menu

This menu allows to assign a **unique address** to the unit for remote control via the Headend Management System CDC. The address must be one from 1 up to 254.

It is also possible to select the **frequency/channel table mode**.

```

►CONFIG
CDC adr: 001
Frequency
  
```

```

►CONFIG
CDC adr: 001
Channel tab:
CCIR N.Z.Ind
  
```

The available channel tables are:

- CCIR
- China
- Chile
- Italy
- France
- Channels OIR
- Ireland
- South-africa
- Poland
- Australia

To make a change, press ● until the desired parameter flashes. This field can then be modified using keys ▲ and ▼.

## f. Transponder Scan Menu

This menu allows the user to repeat the search for an input signal; for example, if the service names have not been found. To force the search again, just press ▲ or ▼.

▶SCAN TRANSP  
Press ▲ or ▼  
to force  
scan

This menu only appears when the unit is connected.

## g. Language Menu

This final extended menu allows the menu languages to be selected (Spanish / English / German):

▶LANGUAGE  
English

Pressing the ▲ and ▼ keys changes the selected language.

**Remark:** The list of menus that follows only can be selected if the unit is hooked to the QPSK input signal:

- Audio menu
- Audio by language/index (audio mode)
- Video format (letterbox, full-screen...)
- Subtitles Menu
- Program

## 5.3. Saving Parameters

Once the desired value has been selected in any of the menus (normal or extended), in order to save the information, hold down the ■ key for approximately 3 seconds. The screen will display the following:

Saving  
settings and  
restarting  
...

Do not remove the controller until the message disappears.

If configuration data is modified but not saved, the previous configuration is restored after 30 seconds have elapsed, i.e. the new changes are cancelled.

Whenever the channel, input frequency or LNB powering is modified, and once the unit is hooked on the QPSK signal, an automatic search of all available services is performed. During analysis, the following message is displayed:

▶SERVICE  
Processing  
input  
channels

The time taken to carry out the process will depend on the number of QPSK multiplex services.

Finally, the LEDS indicate the following operating conditions:

- Left LED (A) = Sufficient input signal level (for guidance).
- Central LED (B) = QPSK demodulator hooked.
- Right LED (C) = MPEG synchronisation (synchronised audio and/or video).

LEDs ON, indicate correct operation.

If one of them goes out, it indicates that something is working wrong.

LED's colour on the TWIN QPSK-PAL unit indicates the hooking state of the QPSK demodulator for both A and B modules (also shown by the B LED status on the programmer):

- it will glow **green** when the QPSK demodulator is **hooked in both modules**.
- it will glow **red** when **any of them is unhooked**.

**Remark:** LED C will be OFF whenever the selected program is not synchronised. This always will happen when it is selected a scrambled service for which the CAM does not allows access.

## 6. - Controlling the Device

This version of the TWIN QPSK-PAL CI unit allows configuration and monitoring via a PC for both local and remote procedures.

### a. Local control

The “Headend Management” programme (v2.14 or higher) is required, as well as a special cable (provided with the programme) that connects a PC serial port to the “PRGM” front panel socket of the TWIN QPSK-PAL CI unit.

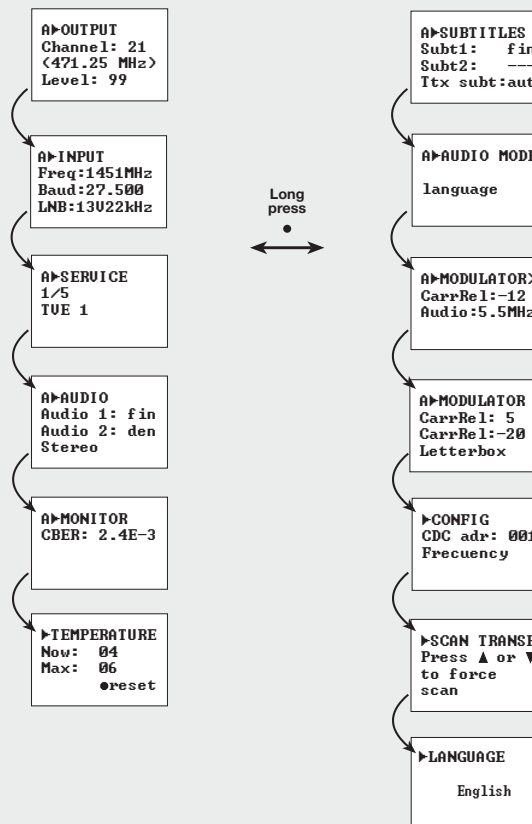
The programme can be used to set up and read all the operating parameters, as well as to monitor the correct operation of the device.

### b. Remote control

Remote control it is possible by means of a Headend Control Unit (ref. 5559 or 555901) that includes the “Headend Management” software as well as the corresponding modem to be connected to the phone line.

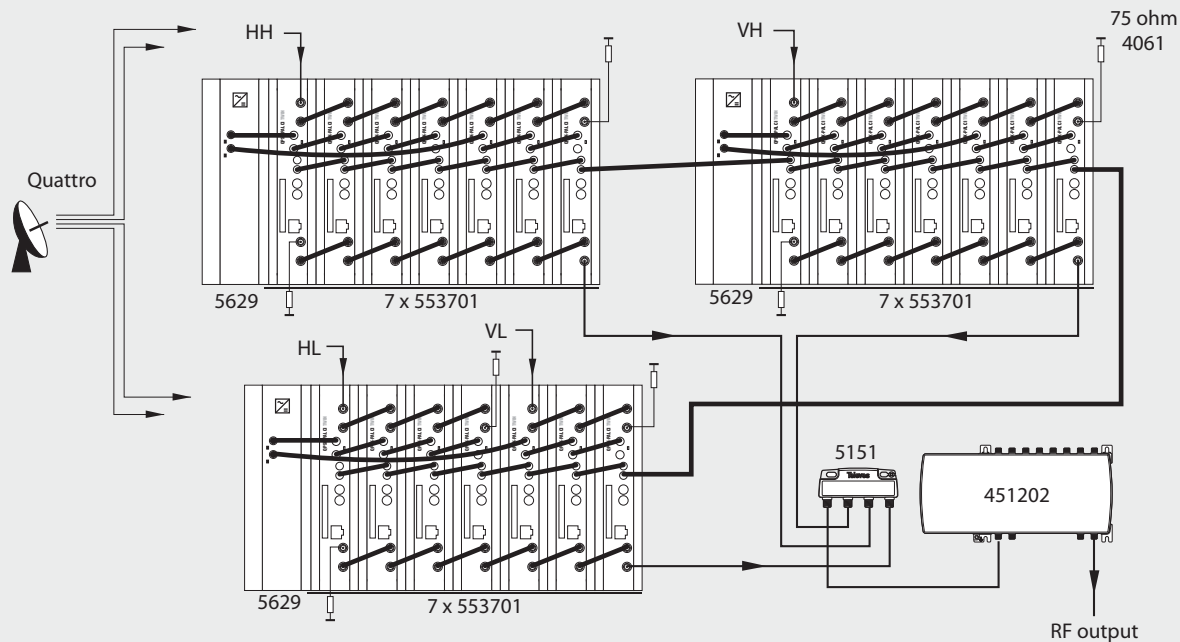
Once the communication with the Headend Management Unit has been established, all controllable T-0X devices, with its own and unique assigned address (from 1 to 254), installed in the headend can be accessed and managed remotely.

### Menu structure



## 7. Application example

### Distribution of 42 channels of TWIN QPSK-PAL CI



The diagram shows a headend to process 42 TV channels from a QPSK transmission

There can be identify the BUS control that interconnects all TWIN QPSK-PAL CI units for which operation it is necessary to include a Headend Controller unit 5559 or 555901 and corresponding software.



## 8. Norms for rack mounting (max. 49 TWIN QPSK-PAL CI - 7 subracks with 5 units in height - 8,7")

### 8.1. Installation of the rack with ventilation facilities

To facilitate the renewal and circulation of the air inside the rack, to reduce the temperature of the units and thus improving their characteristics, it is advisable to place 2 ventilation units of 25W, particularly when the rack with the TWIN QPSK-PAL CI is located in warm places, with temperatures higher than 45°C.

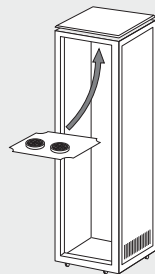


fig. 1

Frontal

Subrack

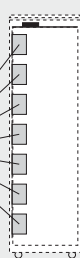
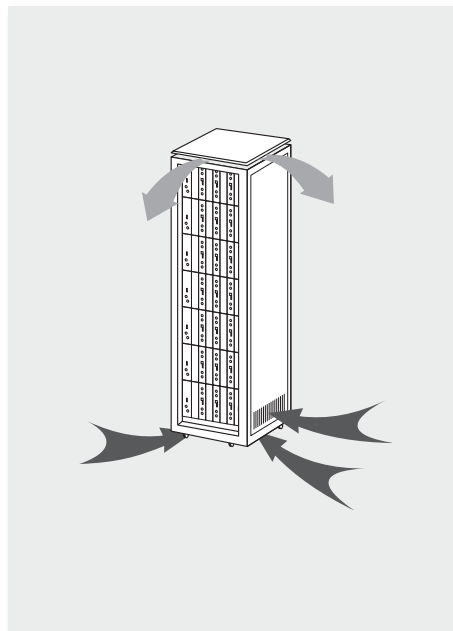


fig. 2



These ventilators will be installed on a tray that is fixed inside the cabinet (fig. 1 & 2). This way, the ventilators will force the fresh air entering from the base of the cabinet, to circulate between the modules and be expelled through a gap on top of the cabinet (3-5 cm approx.). See fig. 3.

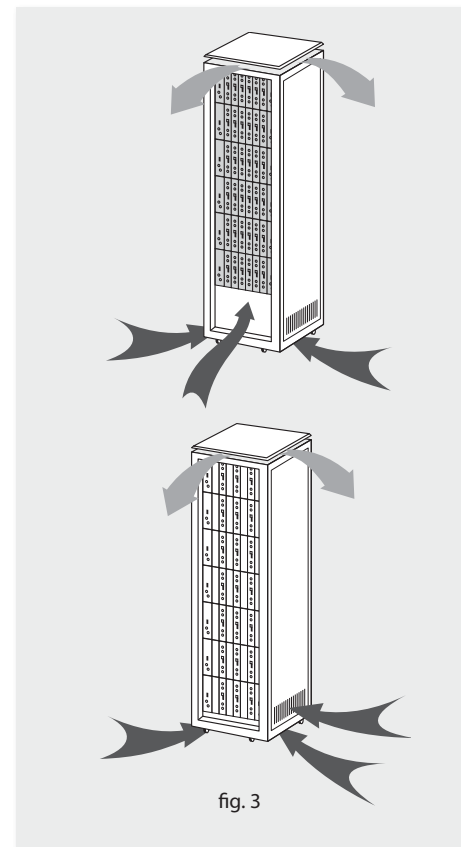


fig. 3

It is very important that this process operates correctly, therefore the following must be observed:

- Do not open the side doors, as this would cause the ventilators to extract the air from the outside rather than the air inside the rack.
- Do not place objects close to the rack that may block the entry and exit openings for the air.
- If the rack is not complete, the subracks must be placed from the top downwards without leaving any gaps in between, fig. 4.

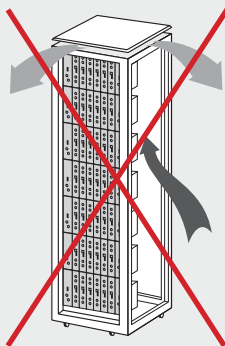
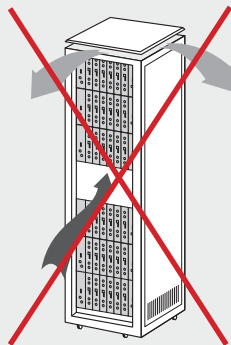
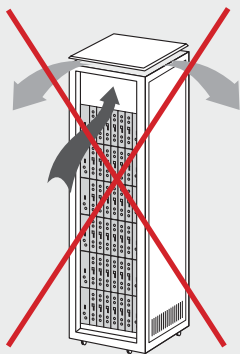


fig. 4

## 8.2. Installation of the rack without ventilation facilities

To install the units in racks without installation facilities, and when the rack is located in a place with a temperature of around 45°C, it is advisable to place the rack completely open, in other words, do not use the side doors. This is to facilitate the ventilation of the units, fig. 5.

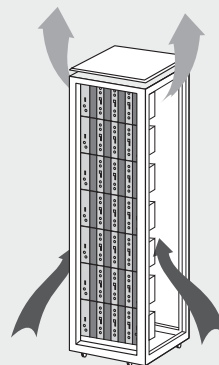


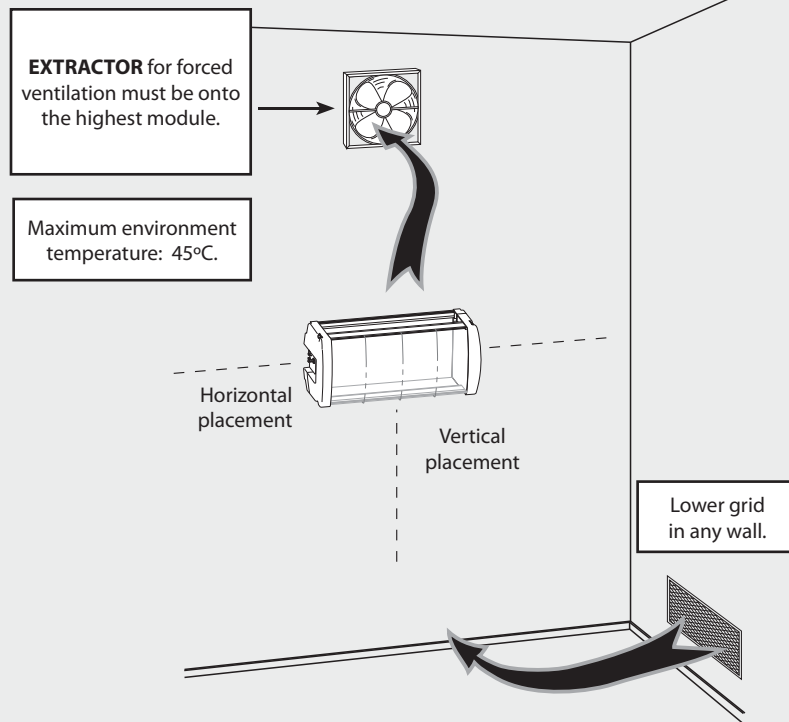
fig. 5

## 9. Norms for cabinet mounting

### IMPORTANT

The scheme of recommended ventilation is the one in the figure in any case of cabinet placement (horizontal or vertical).

The maximum temperature permitted surrounding the highest cabinet is 45°C in both ways of placement, horizontal or vertical way.

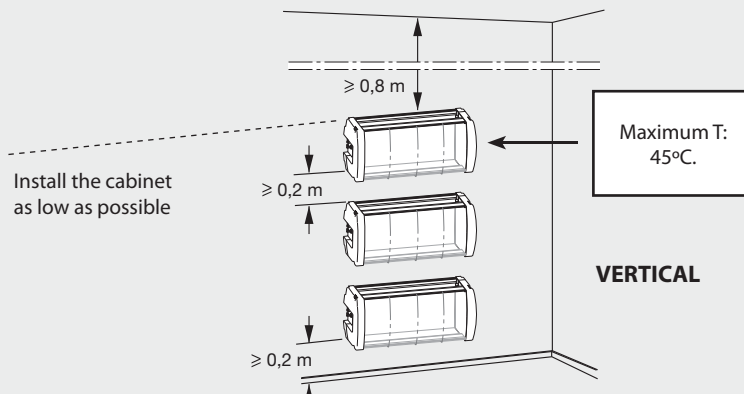
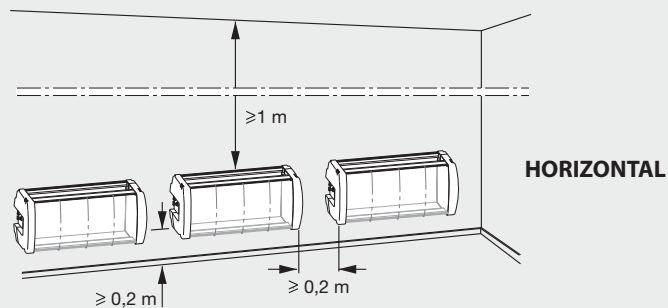


**IMPORTANT**

Horizontal placement of the cabinets is strongly recommended, hanging them as near to the floor as possible.

If the horizontal placement is impossible, then vertical placement is allowed.

Respect the recommended minimum distances in the attached schemes.





## A. Channels table

Tab. 1	Tab. 2		Tab. 3		Tab. 4		Tab. 5		Tab. 6		Tab. 7		Tab. 8		Tab. 9		Tab. 10		
CCIR	China/Taiwan		Chile		Italy		France		OIR channels		Ireland		South-Afric		Poland (OIR)		Australia		
C02	48,25	1	49,75	1	55,25	A	53,75	F01	47,75	R01	49,75	1	45,75	2	53,75	S01	111,25	0	46,25
C03	55,25	2	57,75	2	61,25	B	62,25	L02	55,75	R02	59,25	2	53,75	3	61,75	S02	119,25	1	57,25
C04	62,25	3	65,75	3	67,25	C	82,25	L03	60,5	R03	77,25	3	61,75	4	175,25	S03	127,25	2	64,25
L01	69,25	4	77,25	4	77,25	S01	105,25	L04	63,75	R04	85,25	5	175,25	5	183,25	S04	135,25	3	86,25
L02	76,25	5	85,25	5	83,25	S02	112,25	S01	105,25	R05	93,25	6	183,25	6	191,25	S05	143,25	4	95,25
L03	83,25	6	168,25	6	175,25	S03	119,25	S02	112,25	S01	111,25	7	191,25	7	199,25	S06	151,25	5	102,25
S01	105,25	7	176,25	7	181,25	S04	126,25	S03	119,25	S02	119,25	8	199,25	8	207,25	S07	159,25	S02	112,25
S02	112,25	8	184,25	8	187,25	S05	133,25	S04	126,25	S03	127,25	9	207,25	9	215,25	S08	167,25	S03	119,25
S03	119,25	9	192,25	9	193,25	S06	140,25	S05	133,25	S04	135,25	10	215,25	10	223,25	K06	175,25	S04	126,25
S04	126,25	10	200,25	10	199,25	S07	147,25	S06	140,25	S05	143,25	11	223,25	11	231,25	K07	183,25	S05	133,25
S05	133,25	11	208,25	11	205,25	S08	154,25	S07	147,25	S06	151,25	C21	471,25	12	239,25	K08	191,25	5A	138,25
S06	140,25	12	216,25	12	211,25	S09	161,25	S08	154,25	S07	159,25	C22	479,25	13	247,43	K09	199,25	S06	140,25
S07	147,25	C21	471,25	21	471,25	S10	168,25	S09	161,25	S08	167,25	C23	487,25	C21	471,25	K10	207,25	S07	147,25
S08	154,25	C22	479,25	22	477,25	D	175,25	S10	168,25	R06	175,25	C24	495,25	C22	479,25	K11	215,25	S08	154,25
S09	161,25	C23	487,25	23	483,25	E	183,75	L05	176	R07	183,25	C25	503,25	C23	487,25	K12	223,25	S09	161,25
S10	168,25	C24	495,25	24	489,25	F	192,25	L06	184	R08	191,25	C26	511,25	C24	495,25	S09	231,25	S10	168,25
C05	175,25	C25	503,25	25	495,25	G	201,25	L07	192	R09	199,25	C27	519,25	C25	503,25	S10	239,25	6	175,25
C06	182,25	C26	511,25	26	501,25	H	210,25	L08	200	R10	207,25	C28	527,25	C26	511,25	S11	247,25	7	182,25
C07	189,25	C27	519,25	27	507,25	H1	217,25	L09	208	R11	215,25	C29	535,25	C27	519,25	S12	255,25	8	189,25
C08	196,25	C28	527,25	28	513,25	H2	224,25	L10	216	R12	223,25	C30	543,25	C28	527,25	S13	263,25	9	196,25
C09	203,25	C29	535,25	29	519,25	S11	231,25	S11	231,25	S11	231,25	C31	551,25	C29	535,25	S14	271,25	9A	203,25
C10	210,25	C30	543,25	30	525,25	S12	238,25	S12	238,25	S12	239,25	C32	559,25	C30	543,25	S15	279,25	10-o	209,25
C11	217,25	C31	551,25	31	531,25	S13	245,25	S13	245,25	S13	247,25	C33	567,25	C31	551,25	S16	287,25	10	210,25
C12	224,25	C32	559,25	32	537,25	S14	252,25	S14	252,25	S14	255,25	C34	575,25	C32	559,25	S17	295,25	11-o	216,25
S11	231,25	C33	567,25	33	543,25	S15	259,25	S15	259,25	S15	263,25	C35	583,25	C33	567,25	S18	303,25	11	217,25
S12	238,25	C34	575,25	34	549,25	S16	266,25	S16	266,25	S16	271,25	C36	591,25	C34	575,25	S19	311,25	12	224,25
S13	245,25	C35	583,25	35	555,25	S17	273,25	S17	273,25	S17	279,25	C37	599,25	C35	583,25	S20	319,25	S11	231,25
S14	252,25	C36	591,25	36	561,25	S18	280,25	S18	280,25	S18	287,25	C38	607,25	C36	591,25	S21	327,25	S12	238,25
S15	259,25	C37	599,25	37	567,25	S19	287,25	S19	287,25	S19	295,25	C39	615,25	C37	599,25	S22	335,25	S13	245,25
S16	266,25	C38	607,25	38	573,25	S20	294,25	S20	294,25	S20	303,25	C40	623,25	C38	607,25	S23	343,25	S14	252,25
S17	273,25	C39	615,25	39	579,25	S21	303,25	S21	303,25	S21	311,25	C41	631,25	C39	615,25	S24	351,25	S15	259,25
S18	280,25	C40	623,25	40	585,25	S22	311,25	S22	311,25	S22	319,25	C42	639,25	C40	623,25	S25	359,25	S16	266,25
S19	287,25	C41	631,25	41	591,25	S23	319,25	S23	319,25	S23	327,25	C43	647,25	C41	631,25	S26	367,25	S17	273,25
S20	294,25	C42	639,25	42	597,25	S24	327,25	S24	327,25	S24	335,25	C44	655,25	C42	639,25	S27	375,25	S18	280,25
S21	303,25	C43	647,25	43	603,25	S25	335,25	S25	335,25	S25	343,25	C45	663,25	C43	647,25	S28	383,25	S19	287,25

S22	311,25	C44	655,25	44	609,25	S26	343,25	S26	343,25	S26	351,25	C46	671,25	C44	655,25	S29	391,25	S20	294,25
S23	319,25	C45	663,25	45	615,25	S27	351,25	S27	351,25	S27	359,25	C47	679,25	C45	663,25	S30	399,25	S21	303,25
S24	327,25	C46	671,25	46	621,25	S28	359,25	S28	359,25	S28	367,25	C48	687,25	C46	671,25	S31	407,25	S22	310,25
S25	335,25	C47	679,25	47	627,25	S29	367,25	S29	367,25	S29	375,25	C49	695,25	C47	679,25	S32	415,25	S23	317,25
S26	343,25	C48	687,25	48	633,25	S30	375,25	S30	375,25	S30	383,25	C50	703,25	C48	687,25	S33	423,25	S24	324,25
S27	351,25	C49	695,25	49	639,25	S31	383,25	S31	383,25	S31	391,25	C51	711,25	C49	695,25	S34	431,25	S25	331,25
S28	359,25	C50	703,25	50	645,25	S32	391,25	S32	391,25	S32	399,25	C52	719,25	C50	703,25	S35	439,25	S26	338,25
S29	367,25	C51	711,25	51	651,25	S33	399,25	S33	399,25	S33	407,25	C53	727,25	C51	711,25	S36	447,25	S27	345,25
S30	375,25	C52	719,25	52	657,25	S34	407,25	S34	407,25	S34	415,25	C54	735,25	C52	719,25	S37	455,25	S28	352,25
S31	383,25	C53	727,25	53	663,25	S35	415,25	S35	415,25	S35	423,25	C55	743,25	C53	727,25	S38	463,25	S29	359,25
S32	391,25	C54	735,25	54	669,25	S36	423,25	S36	423,25	S36	431,25	C56	751,25	C54	735,25	C21	471,25	S30	366,25
S33	399,25	C55	743,25	55	675,25	S37	431,25	S37	431,25	S37	439,25	C57	759,25	C55	743,25	C22	479,25	S31	373,25
S34	407,25	C56	751,25	56	681,25	S38	439,25	S38	439,25	S38	447,25	C58	767,25	C56	751,25	C23	487,25	S32	380,25
S35	415,25	C57	759,25	57	687,25	S39	447,25	S39	447,25	S39	455,25	C59	775,25	C57	759,25	C24	495,25	S33	387,25
S36	423,25	C58	767,25	58	693,25	S40	455,25	S40	455,25	S40	463,25	C60	783,25	C58	767,25	C25	503,25	S34	394,25
S37	431,25	C59	775,25	59	699,25	S41	463,25	S41	463,25	C21	471,25	C61	791,25	C59	775,25	C26	511,25	S35	401,25
S38	439,25	C60	783,25	60	705,25	C21	471,25	C21	471,25	C22	479,25	C62	799,25	C60	783,25	C27	519,25	S36	408,25
S39	447,25	C61	791,25	61	711,25	C22	479,25	C22	479,25	C23	487,25	C63	807,25	C61	791,25	C28	527,25	S37	415,25
S40	455,25	C62	799,25	62	717,25	C23	487,25	C23	487,25	C24	495,25	C64	815,25	C62	799,25	C29	535,25	S38	422,25
S41	463,25	C63	807,25	63	723,25	C24	495,25	C24	495,25	C25	503,25	C65	823,25	C63	807,25	C30	543,25	S39	429,25
C21	471,25	C64	815,25	64	729,25	C25	503,25	C25	503,25	C26	511,25	C66	831,25	C64	815,25	C31	551,25	S40	436,25
C22	479,25	C65	823,25	65	735,25	C26	511,25	C26	511,25	C27	519,25	C67	839,25	C65	823,25	C32	559,25	S41	443,25
C23	487,25	C66	831,25	66	741,25	C27	519,25	C27	519,25	C28	527,25	C68	847,25	C66	831,25	C33	567,25	S42	450,25
C24	495,25	C67	839,25	67	747,25	C28	527,25	C28	527,25	C29	535,25	C69	855,25	C67	839,25	C34	575,25	S43	457,25
C25	503,25	C68	847,25	68	753,25	C29	535,25	C29	535,25	C30	543,25			C68	847,25	C35	583,25	S44	464,25
C26	511,25	C69	855,25	69	759,25	C30	543,25	C30	543,25	C31	551,25			C69	855,25	C36	591,25	S45	471,25
C27	519,25			70	765,25	C31	551,25	C31	551,25	C32	559,25					C37	599,25	H21	478,25
C28	527,25			71	771,25	C32	559,25	C32	559,25	C33	567,25					C38	607,25	H22	485,25
C29	535,25			72	777,25	C33	567,25	C33	567,25	C34	575,25					C39	615,25	H23	492,25
C30	543,25			73	783,25	C34	575,25	C34	575,25	C35	583,25					C40	623,25	H24	499,25
C31	551,25			74	789,25	C35	583,25	C35	583,25	C36	591,25					C41	631,25	H25	506,25
C32	559,25			75	795,25	C36	591,25	C36	591,25	C37	599,25					C42	639,25	H26	513,25
C33	567,25			76	801,25	C37	599,25	C37	599,25	C38	607,25					C43	647,25	H27	520,25
C34	575,25			77	807,25	C38	607,25	C38	607,25	C39	615,25					C44	655,25	H28	527,25
C35	583,25			78	813,25	C39	615,25	C39	615,25	C40	623,25					C45	663,25	H29	534,25
C36	591,25			79	819,25	C40	623,25	C40	623,25	C41	631,25					C46	671,25	H30	541,25
C37	599,25			80	825,25	C41	631,25	C41	631,25	C42	639,25					C47	679,25	H31	548,25
C38	607,25			81	831,25	C42	639,25	C42	639,25	C43	647,25					C48	687,25	H32	555,25
C39	615,25			82	837,25	C43	647,25	C43	647,25	C44	655,25					C49	695,25	H33	562,25
C40	623,25			83	843,25	C44	655,25	C44	655,25	C45	663,25					C50	703,25	H34	569,25
C41	631,25			84	849,25	C45	663,25	C45	663,25	C46	671,25					C51	711,25	H35	576,25

[illegible]






## Guarantee

Televés S.A. offers a two year guarantee, beginning from the date of purchase for countries in the EU. For countries that are not part of the EU, the legal guarantee that is in force at the time of purchase is applied. Keep the purchase invoice to determine this date.

During the guarantee period, Televés S.A. complies with the guarantee by repairing or substituting the faulty equipment.

The harm produced by improper usage, wear and tear, manipulation by a third party, catastrophes or any other cause beyond the control of Televés S.A. is not included in the guarantee.

	<b>DECLARATION OF CONFORMITY N° 110905093824</b>	
	<div style="display: flex; justify-content: space-between;"> <div> <b>DECLARACIÓN DE CONFORMIDAD</b>  <b>DECLARAÇÃO DE CONFORMIDADE</b>  <b>DICHARAZIONE DI CONFORMITÀ</b>  <b>DECLARACIJA ZGODNOSTI</b>  <b>DECLARATION OF CONFORMITY</b>  <b>KONFORMITÄTSSERKLÄRUNG</b>  <b>YASTAVUSE SERTIFIKAAT</b> </div> <div> <b>KONFORMITÄTSSERKLÄRUNG</b>  <b>ΠΙΣΤΟΠΟΙΗΤΙΚΟ ΣΥΜΦΩΝΗΤΗΣ</b>  <b>FÖRKLÄRAN OM ÖVERENSSTÄMMELSE</b>  <b>VÄRTIMUSTENMUKAISUUSVAKUUTUS</b>  <b>ATTESTIETTS DEKLARACIJA</b>  <b>ДЕКЛАРАЦІЯ СОУПРАВІДНІСТІ</b>  <b>MEGFELTÉSÉGI NYILATKOZAT</b>  <b>BEKREFTELSE</b>  <b>ДЕКЛАРАЦІЯ ВІДПОВІДНОСТІ</b> </div> </div>	
<b>Manufacturer / Fabricante / Fabricant / Fabricante / Fabrikant / Käsitajaväritig / Tillverkare / Valmistaja / Producent / Gaminiojas / Работодатель / Produsator / Gjafar / Fabrikant / Producent / Fabrikant / Bupidnax / Valmistaja:</b>		
<p><b>Televes S.A.</b>  <b>Rua Benéfica de Conxo, 17 - 15706 - Santiago de Compostela - Spain</b></p> <p><b>Declare under our own responsibility the conformity of the product / Declara bajo su exclusiva responsabilidad la conformidad del producto / Declara sob sua exclusiva responsabilidade a conformidade do produto / Déclare sous notre propre responsabilité la conformité de ce produit / Dichiaro sotto la mia esclusiva responsabilità la conformità del prodotto / Wij overnemen de Verantwoording für die Konformität des Produktes / Πιστοποιώ με δική μου ευθύνη την συμμόρφωση του προϊόντος / Forståelse om overensstemmelse enligt tillverkarens eget ansvar för produkten / Vastuunotto yksinomaan omalla vastuullamme luotteen yhdenmukaisuus / Obowiązujemy na własną odpowiedzialność zgodności wyrobu / Deklaruojame savo atsakomybe, kad produktas yra atitinkamas / Заохочу єм своєю власною відповідальністю о згодуності виробу / Declaram pe propria răspundere ca produsul este în conformitate cu cerințele esențiale și celelalte prevederi aplicabile / Sogit följande/gjörklar kiplensig, kupp a berett megdel / Erklærer under vores eget ansvar overensstemmelse for produkt / Erklærer under vårt eget ansvar överensstemmelsen för produkt / Wij nemen de verantwoordelijkheid voor de conformiteit van het product / Заохочу єм своєю відповідальністю о згодуності виробу / Kinnitame teete vastavast:</b></p>		
<p><b>Reference / Referencia / Referência / Référence / Articolo / Artikelnummer / Adjuung / Referens / Referensi / Numer / Katalogowy / Produkto numeris / Агмауа / Referinta / Termékzám / Varenummer / Varenummer / Artikelnummer / Агмауа / Vide:</b></p>		
<p><b>5537XX</b></p>		
<p><b>Description / Descripción / Descrição / Description / Descrizione / Beschreibung / Περιγραφή / Beskrivning / Kovau / Opis / Produkto aprašas / Onuacua / Descriere / Lektis / Beskrivelse / Beskrivelse / Beschrijving / Onac / Kirjeläse:</b></p>		
<p><b>TWIN QPSK-PAL CI TX</b></p>		
<p><b>Trademark / Marca / Marca / Marque / Marchio / Handelsmarke / Márka / Varumärke / Tavaramerkki / Marka / Prekts ženklas / Topynosu ženkla / Marca / Märkens / Varemarker / Varemerke / Handelsmerk / Topynosu ženkla / Kaubamärk:</b></p>		
<p><b>Televes</b></p>		
<p><b>With the requirements of / Con los requerimientos de / Con as especificações de / Avec les conditions de / Con i requisiti di / Die Voraussetzungen erfüllen / Με τις απαιτήσεις του / Enligt följande bestämmelser / Seuranvien määrätyksin / Zgodnie z wymaganiami / Atitinka reikalavimus / Требования / În conformitate cu / At alábbi követelmények / Med bestämmelserne / In overensstemning med / atitinka do norm / tingimata:</b></p>		
<p><b>- Low Voltage Directive 2006 / 95 / EC,  - EMC Directive 2004 / 108 / EC.</b></p>		
<p><b>Following standards / Con las normas / Con as normas / Selon les normes / Con le norme / Folgende Anforderungen / Atitinka reikalavimus / Följande standard / Seuranvien standardien / Zastosowanie następujących norm / Pagal standartus / Cizdynaux cnaudapmos / Respecta următoarele standarde / A Következő szabványokat / Följende standarder / Följende richtlijnen en normen / Насупиуау снаудапмис / Järgneiste standardite:</b></p>		
<p><b>EN 60728-11:2005, EN 50083-2:2006</b></p>		
<div style="display: flex; justify-content: space-between; align-items: center;"> <div data-bbox="512 952 606 1032">  </div> <div data-bbox="861 907 1037 1032">  <p><b>L. Fernández Carnero</b>  Technical Director</p> </div> </div>		



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