

## About PROCOM A/S

PROCOM A/S is one of the leading suppliers of antenna systems for wireless 2-way radio communication for professional users. In Denmark we produce a wide range of products, which apart from antennas also comprises combiners, filters and measuring equipment.

Procom has four subsidiaries and a network of dealers covering the whole world. Procom is in close co-operation with a number of large international customers within the industry and within the public emergency forces such as Ministries of Defence, police forces, fire-fighting brigades and civil defences.

An essential part of our success in developing products for wireless 2-way radio communication is the fact that our products have the ability to tolerate an extreme load. Our organization is always ready to develop and manufacture custom-made solutions.

Procom is part of the Amphenol Corporation. Amphenol is one of the largest manufacturers of interconnect products in the world.

The company designs, manufactures and markets electrical, electronic and fiber optic connectors, coaxial and flat-ribbon cable, and interconnect systems.

The primary end markets for the company's products are communications and information processing markets, including cable television, cellular telephone and data communication and information processing systems; aerospace and military electronics; and automotive, rail and other transportation and industrial applications.



*RF is our competence!*

An **Amphenol**<sup>®</sup>  
PRIVATE NETWORKS COMPANY

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# Procom Tetra Combiner

## Reliable communication without interference



- Mobile communication command
- First responders
- Police- & fire brigade stations
- Control rooms



Tetra combiners prevent interference and noise in the transceiver units, ensuring reliable communication using multiple radios



# Mission Critical communication without interference

To ensure the highest possible decoupling between up to eight TETRA radios, Procom has developed six new combiners. This is the best technology to insure reliability in environment with parallel operation of multiple devices.



Absolute reliability in parallel operation of multiple devices



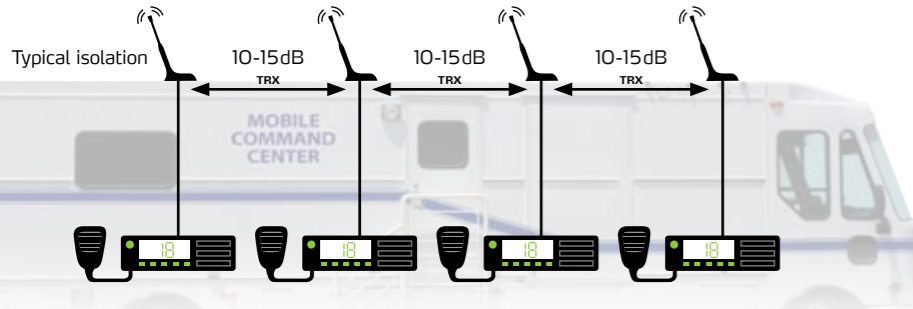
Image courtesy of LDV, Inc.

The two-, three-, four-, six- and eight-channel TETRA-combiners give a **trouble-free connection of up to eight TETRA radios** into an arbitrary TETRA-running antenna! The unique isolation of more than 62 dB between the radios is higher than

what the ETSI-standard is demanding. Impossible to achieve this value with the plurality of individual antennas mounted on a vehicle roof. A balance between losses in TX- and RX-branch gives a secure two-way connection.

# When Mission Critical communication has to be reliable

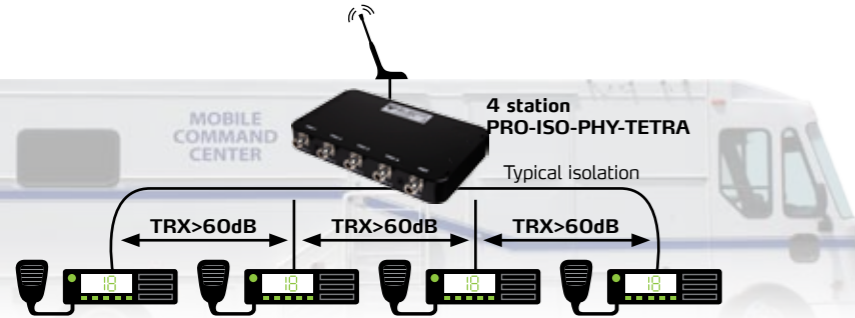
## Communication **WITHOUT** the mobile TETRA combiner



This communication solution is NOT recommended because the maximum isolation **without** one of Procom's mobile TX combiners PRO-ISO-PHY-TETRA-S is: 10-15 dB

**NOT RECOMMENDED**

## Communication **WITH** the mobile TETRA combiner

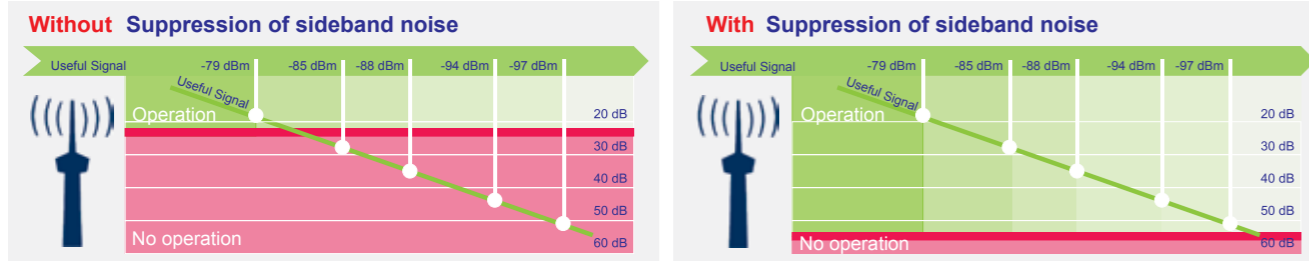


We recommend this communication solution because the maximum isolation **with** the mobile TETRA combiner PRO-ISO-PHY-TETRA-S **exceeds 62 dB** (TRX ↔ TRX)

**RECOMMENDED**

## Sideband noise **with and without** suppression

**THE DIFFERENCE**



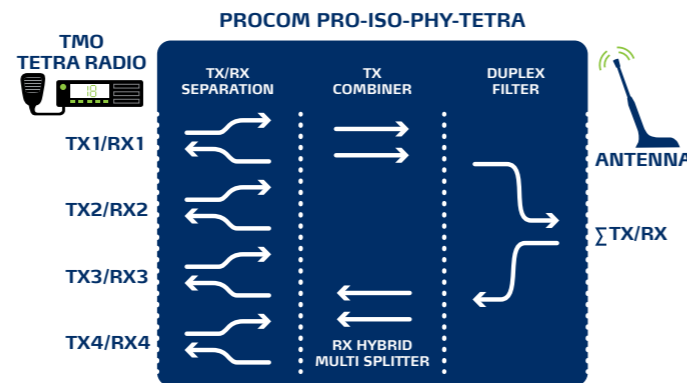
Many TETRA transmitters generate broadband TX sideband noise. The sideband noise is generated in the power amplifier. The sideband noise from one radio transmitter seriously degrades the sensitivity of a nearby positioned radio

receiver. Depending on the strength of sideband noise the receiver desensitization can cause the receiver to become practically inoperable. The **PRO-ISO-PHY-TETRA-S** combiner provides more than 62 dB isolation

between the radios and ensuring minimal degradation of the receivers' sensitivity. With the use of the combiner the **suppression of the sideband noise will increase from 25 to 62 dB.**

## PRO-ISO-PHY-TETRA - how it works

- The TETRA Combiner utilizes circulators to separate the (TX) signal and the (RX) signal in two and sends the TX signal to an isolator.
- The TX-signal is fed through a low-pass filter into a hybrid. The hybrid combines the TX carriers to a helical duplex filter.
- The RX-signals run from the antenna through the duplex filter to the hybrid RX-splitter and are sent via the RX isolators to the RX/TX circulator



# Combiners for up to eight Mobile TETRA Radios Supports TMO & DMO

- The use of high-quality system components such as highly selective helical duplex filters and high-performance isolators provides high isolation between the carriers.
- The smallest and most compact design on the market.
- Suitable for both stationary and mobile use.
- Also available in tray for 19" rack mounting.
- The six products have more than 60 dB isolation between the ports.



## PROCOM TETRA COMBINERS

To ensure the highest possible decoupling between several TETRA- radios, Procom has developed three mobile combiners



## Useful for:

- First Responders
- Police & Fire Brigade
- Control rooms
- Mobile command controls

## PRO-ISO-PHY-TETRA-S2

- Two-channel TETRA-station combiner
- The PRO-ISO-PHY-TETRA-2 combiner provides the possibility of connecting up to two TETRA radios into one common antenna
- The PRO-ISO-PHY-TETRA-S2 models are available in the frequency range 380 - 470 MHz
- ETSI compliant connection of two digital radios
- The smallest and most compact design on the market
- Also available in tray for 19" rack mounting



## PRO-ISO-PHY-TETRA-S6

- Six-channel TETRA station combiner
- The PRO-ISO-PHY-TETRA-S6 combiner provides the possibility of connecting up to six TETRA radios into one common antenna
- PRO-ISO-PHY-TETRA-S6 consist of high quality components such as highly selective helical duplex filters and high-performance isolators which provides more than 62 dB isolation between the ports
- ETSI compliant connection of six digital radios
- The smallest and most compact design on the market
- Suitable for both stationary and mobile use
- Also available in tray for 19" rack mounting



## PRO-ISO-PHY-TETRA-S3

- Three-channel TETRA-Station Combiner
- The PRO-ISO-PHY-TETRA-S3 combiner provides the possibility of connecting up to three TETRA radios into one common antenna
- ETSI compliant connection of three digital radios
- The PRO-ISO-PHY-TETRA-S3 has improved isolation between the ports - more than 62 dB - and lower insertion loss
- The use of high-quality system components such as highly selective helical duplex filters and high-performance isolators provides high isolation and secure communication
- The smallest and most compact design on the market
- Suitable for both stationary and mobile use
- Also available in tray for 19" rack mounting



## PRO-ISO-PHY-TETRA-S8

- Eight-channel TETRA-station combiner
- The PRO-ISO-PHY-TETRA-S8 combiner provides the possibility of connecting up to eight TETRA radios into one common antenna
- The use of high-quality system components such as highly selective helical duplex filters and high-performance isolators provides high isolation and secure communication
- The PRO-ISO-PHY-TETRA-S8 models are available in the frequency range 380 - 425 MHz
- ETSI compliant connection of eight digital radios
- The smallest and most compact design on the market
- Also available in tray for 19" rack mounting



## PRO-ISO-PHY-TETRA-S4

- Four-channel TETRA-Station Combiner
- The PRO-ISO-PHY-TETRA-S4 combiner provides the possibility of connecting up to four TETRA radios into one common antenna
- PRO-ISO-PHY-TETRA-S4 consist of high quality components such as highly selective helical duplex filters and high-performance isolators which provides more than 60 dB isolation between the ports
- ETSI compliant connection of four digital radios
- The use of high-quality system components such as highly selective helical duplex filters and high-performance isolators provides high isolation and secure communication
- The smallest and most compact design on the market
- Suitable for both stationary and mobile use
- Also available in tray for 19" rack mounting



## PRO-ISO-PHY-TETRA-S-ELW

- Two TMO TETRA Mobile-Station and one DMO TETRA Mobile Station
- The PRO-ISO-PHY-TETRA-S-ELW combiner provides the possibility of connecting two TMO and one DMO TETRA radios into one common antenna
- ETSI and DIN-SPEC 14507-2 compliant connection of two digital radios
- The PRO-ISO-PHY-TETRA-S-ELW has improved isolation between the ports - more than 60 dB - and lower insertion loss
- The use of high-quality system components such as highly selective helical duplex filters and high-performance isolators provides high isolation and secure communication
- Built-in high-pass filter, for attenuating interference from 150 - 174 MHz and 74 - 87.5 MHz bands
- The smallest and most compact design on the market
- Suitable for both stationary and mobile use
- Also available in tray for 19" rack mounting



## Technical data

Product & Diagram	Radios	Specifications*
<b>PRO-ISO-PHY-TETRA-S6</b> 	6	<b>ELECTRICAL</b> MODEL ..... PRO-ISO-PHY-TETRA-S6 TYPE ..... TETRA combiner TX/RX FREQUENCY ..... TX: 380 - 385 MHz RX: 390 - 395 MHz or TX: 410 - 415 MHz RX: 420 - 425 MHz Other frequencies available in request INSERTION LOSS TX-ANT. .... Typ. < 13 dB INSERTION LOSS RX-ANT. .... Typ. < 13 dB ISOLATION ..... TX-TX: > 62 dB (380-385 MHz & 410-415 MHz) RX - RX: > 62 dB (390 - 395 MHz & 420-425 MHz) TX - RX / RX - TX: > 62 dB SWR ..... < 1.5 MAX. POWER ..... 25 W/station GROUP DELAY VARIATION ..... TX-ANT. < 120 nsec. RX-ANT. < 150 nsec. <b>MECHANICAL</b> CONNECTOR TYPE ..... N-female COLOUR ..... Black DIMENSIONS (L x W x H) ..... 150 (excl. conn.) x 250 x 35 mm / 5.91 (excl. conn.) x 9.84 x 1.38 in. WEIGHT ..... 4.8 kg / 10.58 lb. <b>ENVIRONMENTAL</b> IP-RAITING ..... IP-62
<b>PRO-ISO-PHY-TETRA-S8</b> 	8	<b>ELECTRICAL</b> MODEL ..... PRO-ISO-PHY-TETRA-S8 TYPE ..... TETRA combiner TX/RX FREQUENCY ..... TX: 380 - 385 MHz RX: 390 - 395 MHz or TX: 410 - 415 MHz RX: 420 - 425 MHz INSERTION LOSS TX-ANT. .... < 13 dB INSERTION LOSS RX-ANT. .... < 13 dB ISOLATION ..... TX-TX: > 62 dB (380-385 MHz & 410-415 MHz) RX - RX: > 62 dB (390 - 395 MHz & 420-425 MHz) TX - RX / RX - TX: > 62 dB SWR ..... < 1.5 MAX. POWER ..... 25 W/station GROUP DELAY VARIATION ..... TX-ANT. < 120 nsec. RX-ANT. < 150 nsec. <b>MECHANICAL</b> CONNECTOR TYPE ..... N-female COLOUR ..... Black DIMENSIONS (L x W x H) ..... 483 (excl. conn.) x 176 x 240 mm 19.0 (excl. conn.) x 6.93 x 9.45 in. WEIGHT ..... 4.8 kg / 10.58 lb. <b>ENVIRONMENTAL</b> IP-RAITING ..... IP-62
<b>PRO-ISO-PHY-TETRA-S-ELW</b> 	2 + direct mode	<b>ELECTRICAL</b> MODEL ..... PRO-ISO-PHY-TETRA-S-ELW TYPE ..... TETRA combiner TX/RX FREQUENCY ..... TX: 380 - 385 MHz RX: 390 - 395 MHz INSERTION LOSS ..... < 7 dB TX-ANT. .... INSERTION LOSS ..... < 7 dB RX-ANT. .... DMO FREQUENCY ..... 406 - 410 MHz INSERTION LOSS ..... < 2 dB DMO-ANT. .... (Typ. 2.4 dB) ISOLATION ..... TX - TX: > 62 dB (380 - 385 MHz) RX - RX: > 62 dB (390 - 395 MHz) TX - RX / RX - TX: > 62 dB ISOLATION DMO-TMO ..... > 60 dB MAX. POWER ..... 25 W / station SWR ..... < 1.5 GROUP DELAY VARIATION ..... TX-ANT. : < 120 nsec. RX-ANT. : < 150 nsec. <b>MECHANICAL</b> CONNECTOR TYPE ..... N-female COLOUR ..... Black DIMENSIONS (L x W x H) ..... 190 (excl. conn.) x 200 x 35 mm / 5.91 (excl. conn.) x 7.87 x 1.38 in. WEIGHT ..... Approx. 1940 g / 4.28 lb. <b>ENVIRONMENTAL</b> IP-RAITING ..... IP-62

\*Tested in accordance with:  
 Random test: EN 60068-2-64, test specification: EN 300 019-2-5 V3.0.0.  
 Shock test: EN 60068-2-27, test specification: EN 300 019-2-5 V3.0.0.  
 Bump test: EN 60068-2-29, test specification: EN 300 019-2-5 V3.0.0.

## Technical data

Product & Diagram	Radios	Specifications*
<b>PRO-ISO-PHY-TETRA-S2</b> 	2	<b>ELECTRICAL</b> MODEL ..... PRO-ISO-PHY-TETRA-S2 TYPE ..... TETRA combiner TX/RX FREQUENCY ..... TX: 380 - 385 MHz RX: 390 - 395 MHz or TX: 410 - 415 MHz RX: 420 - 425 MHz Other frequencies available in request INSERTION LOSS TX-ANT. .... < 6.0 dB INSERTION LOSS RX-ANT. .... < 6.0 dB ISOLATION ..... TX-TX: > 62 dB (380-385 MHz & 410-415 MHz) RX - RX: > 62 dB (390 - 395 MHz & 420-425 MHz) TX - RX / RX - TX: > 62 dB SWR ..... < 1.5 MAX. POWER ..... 25 W/station GROUP DELAY VARIATION ..... TX-ANT. < 120 nsec. RX-ANT. < 150 nsec. <b>MECHANICAL</b> CONNECTOR TYPE ..... N-female COLOUR ..... Black DIMENSIONS (L x W x H) ..... 150 (excl. conn.) x 150 x 35 mm / 5.91 (excl. conn.) x 5.91 x 1.38 in. WEIGHT ..... Approx. 1820 g / 4.01 lb. <b>ENVIRONMENTAL</b> IP-RAITING ..... IP-62
<b>PRO-ISO-PHY-TETRA-S3</b> 	3	<b>ELECTRICAL</b> MODEL ..... PRO-ISO-PHY-TETRA-S3 TYPE ..... TETRA combiner TX/RX FREQUENCY ..... TX: 380 - 385 MHz RX: 390 - 395 MHz or TX: 410 - 415 MHz RX: 420 - 425 MHz INSERTION LOSS TX-ANT. .... < 9.0 dB INSERTION LOSS RX-ANT. .... < 9.0 dB ISOLATION ..... TX-TX: > 62 dB (380-385 MHz & 410-415 MHz) RX - RX: > 62 dB (390 - 395 MHz & 420-425 MHz) TX - RX / RX - TX: > 62 dB SWR ..... < 1.5 MAX. POWER ..... 25 W/station GROUP DELAY VARIATION ..... TX-ANT. < 120 nsec. RX-ANT. < 150 nsec. <b>MECHANICAL</b> CONNECTOR TYPE ..... N-female COLOUR ..... Black DIMENSIONS (L x W x H) ..... 150 (excl. conn.) x 250 x 35 mm / 5.91 (excl. conn.) x 9.84 x 1.38 in. WEIGHT ..... Approx. 2400 g / 5.29 lb. <b>ENVIRONMENTAL</b> IP-RAITING ..... IP-62
<b>PRO-ISO-PHY-TETRA-S4</b> 	4	<b>ELECTRICAL</b> MODEL ..... PRO-ISO-PHY-TETRA-S4 TYPE ..... TETRA combiner TX/RX FREQUENCY ..... TX: 380 - 385 MHz RX: 390 - 395 MHz or TX: 410 - 415 MHz RX: 420 - 425 MHz Other frequencies available in request INSERTION LOSS TX-ANT. .... < 9.0 dB INSERTION LOSS RX-ANT. .... < 9.0 dB ISOLATION ..... TX-TX: > 62 dB (380-385 MHz & 410-415 MHz) RX - RX: > 62 dB (390 - 395 MHz & 420-425 MHz) TX - RX / RX - TX: > 62 dB SWR ..... < 1.5 MAX. POWER ..... 25 W/station GROUP DELAY VARIATION ..... TX-ANT. < 120 nsec. RX-ANT. < 150 nsec. <b>MECHANICAL</b> CONNECTOR TYPE ..... N-female COLOUR ..... Black DIMENSIONS (L x W x H) ..... 150 (excl. conn.) x 250 x 35 mm / 5.91 (excl. conn.) x 9.84 x 1.38 in. WEIGHT ..... Approx. 2400 g / 5.29 lb. <b>ENVIRONMENTAL</b> IP-RAITING ..... IP-62

\*Tested in accordance with:  
 Random test: EN 60068-2-64, test specification: EN 300 019-2-5 V3.0.0.  
 Shock test: EN 60068-2-27, test specification: EN 300 019-2-5 V3.0.0.  
 Bump test: EN 60068-2-29, test specification: EN 300 019-2-5 V3.0.0.