



Optické konektory a řešení pro datová centra

Ing. Jaromír Šíma

Kam kráčí telekomunikační sítě – Plzeň 2018



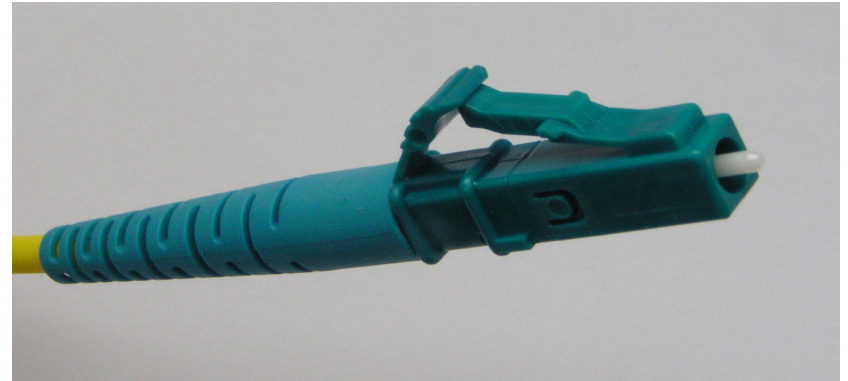
Optické konektory

- FOCIS - ANSI/TIA/EIA-604-x (Fiber Optic Connector Intermateability Standard)

| <u>FOCIS number</u> | <u>typ</u> | <u>výrobce</u> |
|---------------------|--------------------|--------------------------------|
| – 1 | BICONIC | Bell Labs, 3M |
| – 2 | ST (BFOC 2.5) | Lucent Technologies |
| – 3 | SC, SC/APC | NTT |
| – 4 | FC, FC/APC | NTT |
| – 5 | MPO/MTP | USConec, AMP, Molex,... |
| – 6 | Fiber-Jack (OJ) | Panduit Corp. (OptiJack) |
| – 7 | SG (VF-45) | 3M Volition |
| – 8 | (Mini-MT) | Siecor Corp. |
| – 9 | (Mini-MAC) | Berg Electronics |
| – 10 | LC, LC/APC | Lucent Technologies |
| – 11 | (SCDC/SCQC) | Siecor, Siemens, IBM |
| – 12 | MT-RJ | AMP, Siecor, USConec |
| – 13 | LX-5, SFOC 1,25 | ADC (SFFSC) |
| – 14 | SMC | Siemens/Infineon |
| – 15 | MF | Diamond |
| – 16 | LSH (E2000) | Diamond |
| – 17 | MU | NTT |
| – 18 | MPO-16/32 | 16/32 vláken, varianta MPO |

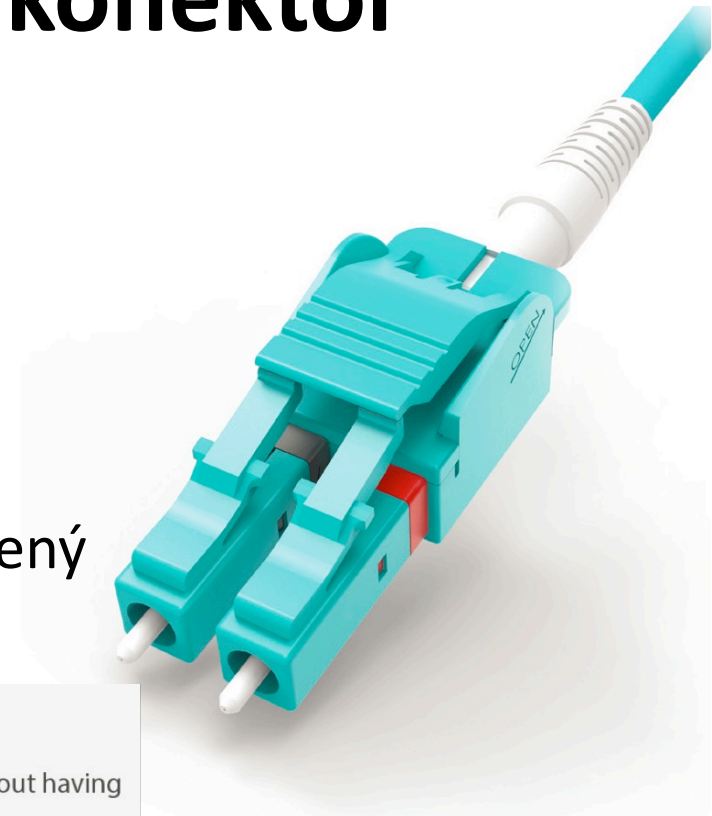
LC konektor

- Vyvinutý firmou Lucent Technologies/Avaya
- LC = Lucent / Little / Local Connector
- IEC 61754-20:2012
- FOCIS ANSI/TIA/EIA-604-10
- SFF – Small Form Factor
- Ferule průměr 1,25 mm
- Provedení simplex, duplex, odpružená ferule
- Snap Lock – zámek typu západka
- Verze MM, SM, POF
- Broušení PC, APC
- Konektor pro transceivery SFP, XFP, ..
- Všeobecně hodně používaný pro datacom a telecom aplikace, FTTH



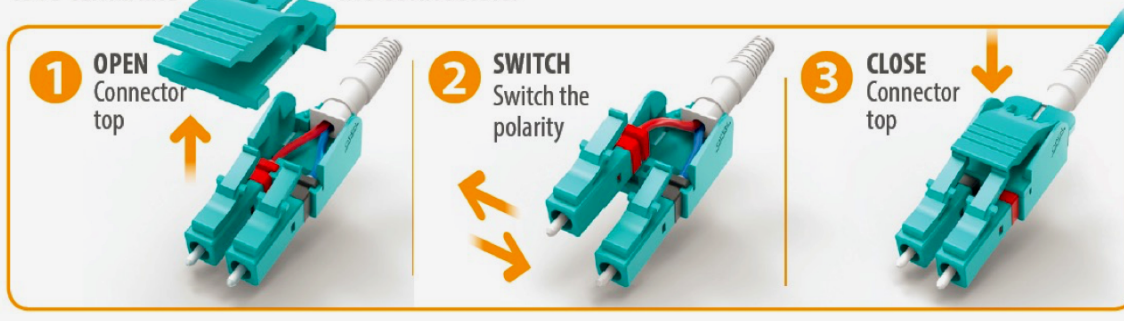
SENKO LC Uniboot konektor

- **Duplexní oválný kabel**
 - Snadný ohyb do všech stran
 - Méně prostoru ve svazku
- **Možnost změny polarity**
 - Uživatelská změna – křížený/nekřížený



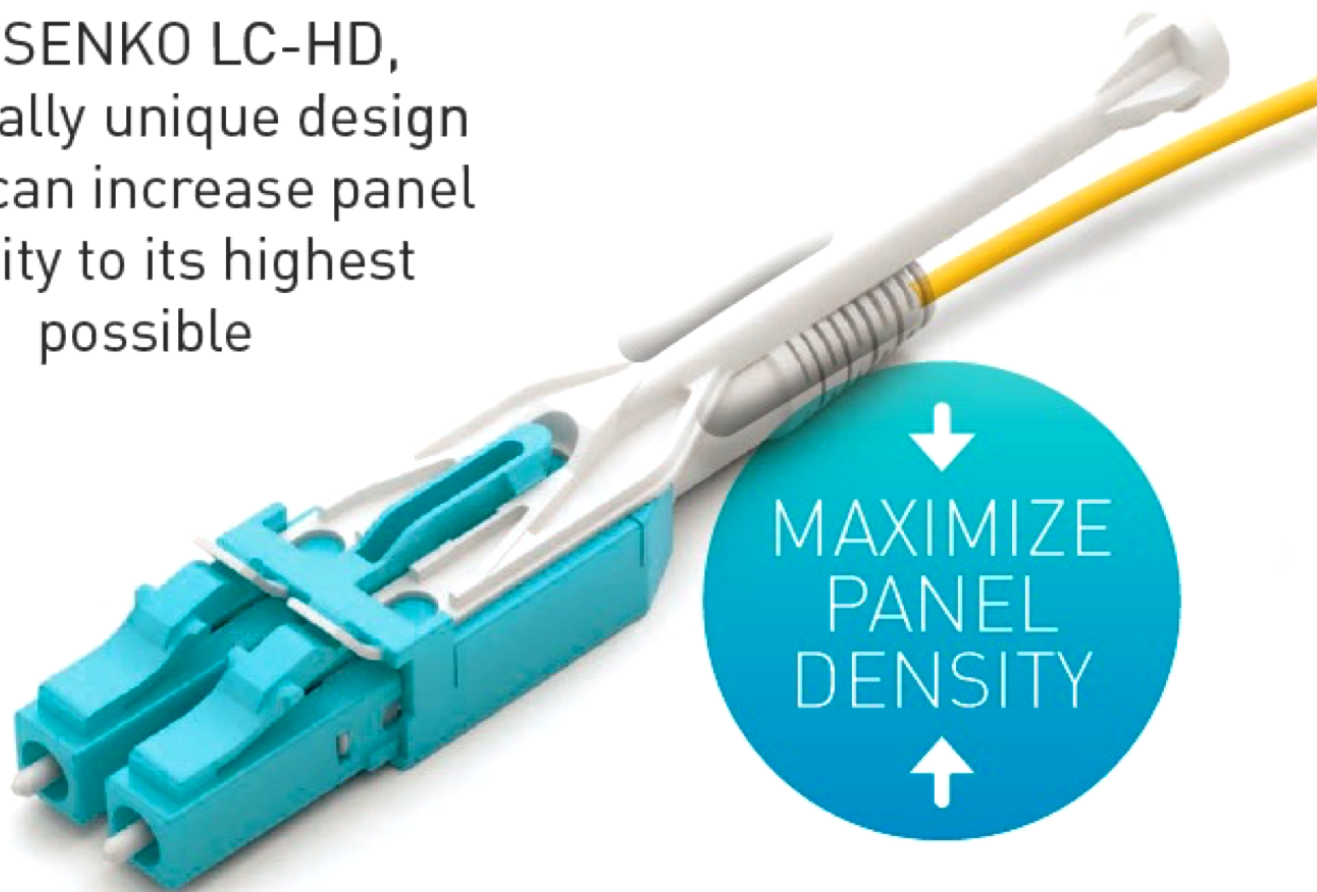
SWITCH POLARITY

Allows the fiber polarity to be switched at the time of cable assembly installation without having to re-terminate the connectors.



SENKO LC-HD konektor

The SENKO LC-HD,
is a totally unique design
which can increase panel
density to its highest
possible

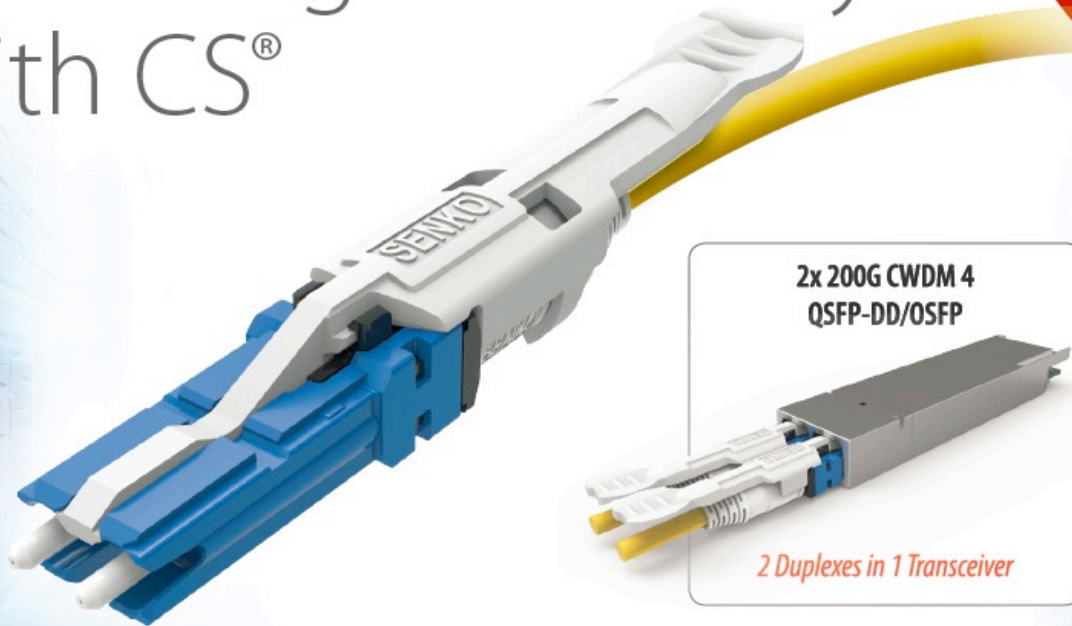


SENKO CS konektor

CS[®] | **CONNECTOR**

Reach higher density
with CS[®]

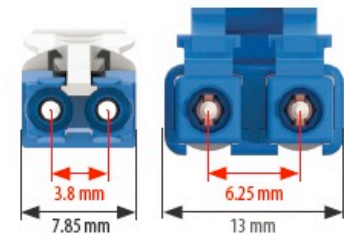
NEW
Duplex connector
optimized for 400G
new generation
Data Center



2x 200G CWDM 4
QSFP-DD/OSFP

2 Duplexes in 1 Transceiver

CS CONNECTOR VS. LC DUPLEX



CS Connector

LC Duplex

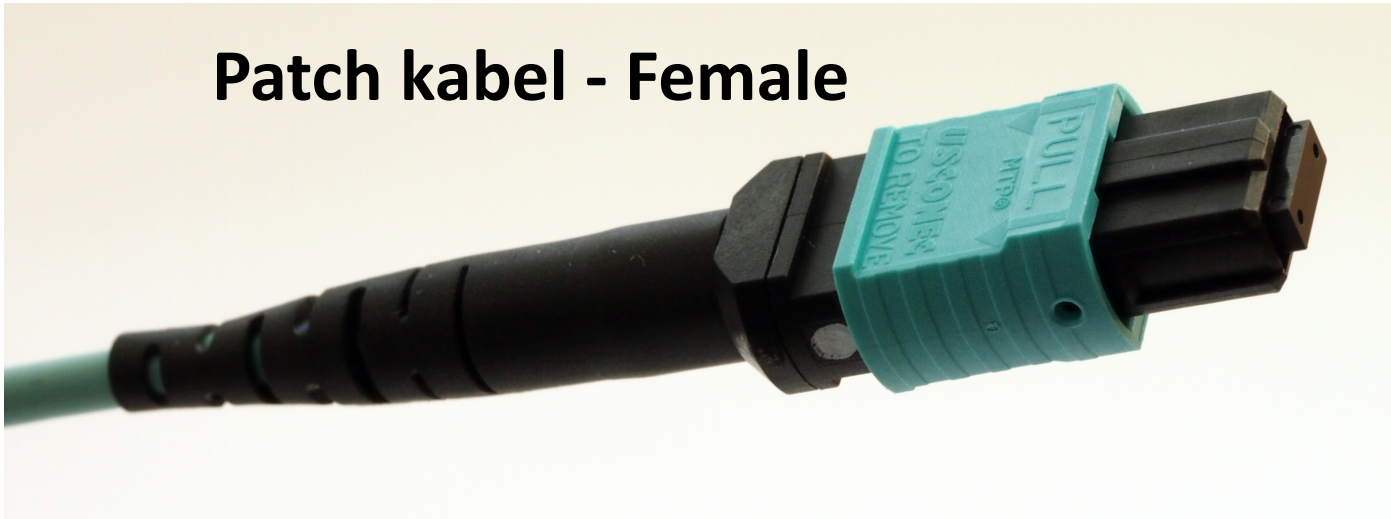
MPO/MTP[®] konektor

- MPO konektor je „ Multi-fiber Push On connector“
- IEC-61754-7
 - Fibre optic interconnecting devices and passive components - Fibre optic connector interfaces - Part 7: Type MPO connector family
- TIA-604-5-D (FOCIS 5)
 - Fiber Optic Connector Intermateability Standard , Type MPO.
- Obdélníková ferule – plast, vystředění pomocí trnů (Samec/Samice)
- MTP[®] je registrovaná značka firmy US Conec
- MTP[®] konektor je kompatibilní s konektorem MPO
 - Vylepšené vedení MT ferule
 - Oválná pružina pro MT feruli
 - Vyměnitelný klíč
 - Možnost změny Samec-Samice
 - Přesnější navedení středících trnů, eliptický tvar špičky

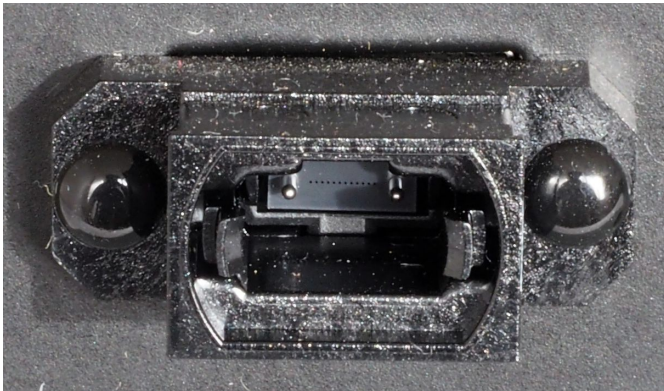


MPO/MTP konektor

Patch kabel - Female

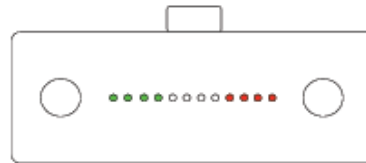


Zásuvka, Transceiver - Male



MPO/MTP konektory pro 40/100GE

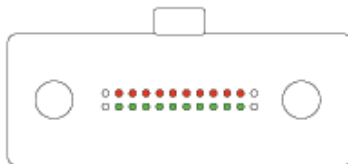
40GBASE-SR4
100GBASE-SR4



Left 4 pins are Tx
Right 4 pins are Rx
(inner 4 pins unused)

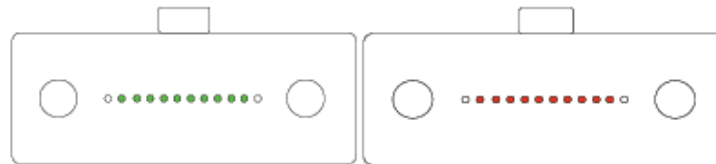


100GBASE-SR10



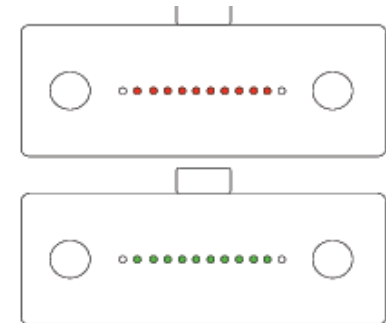
Inner 10 pins, Top Row are Rx
Inner 10 pins, Bot Row are Tx
(outermost pins both rows unused)

Option A
(recommended)



Inner 10 pins, Left Side are Tx
Inner 10 pins, Right Side are Rx
(outermost pins each side unused)

Option B

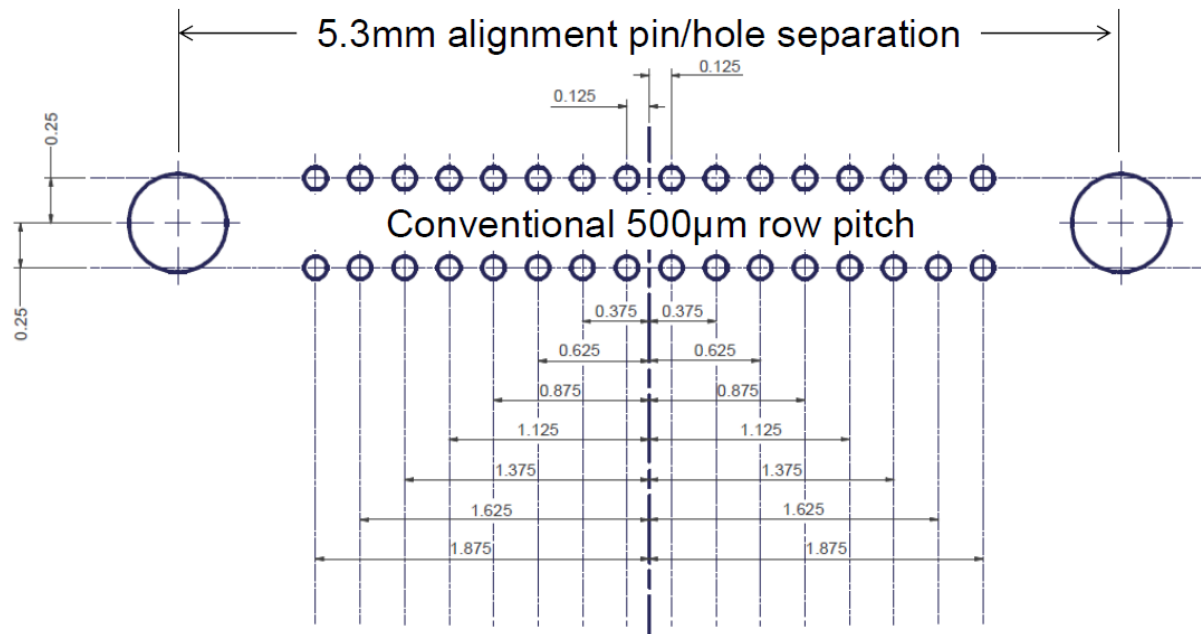
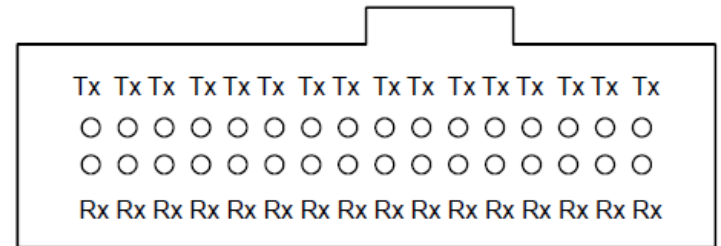


Inner 10 pins, Top are Rx
Inner 10 pins, Bot are Tx
(outermost pins Top & Bot unused)

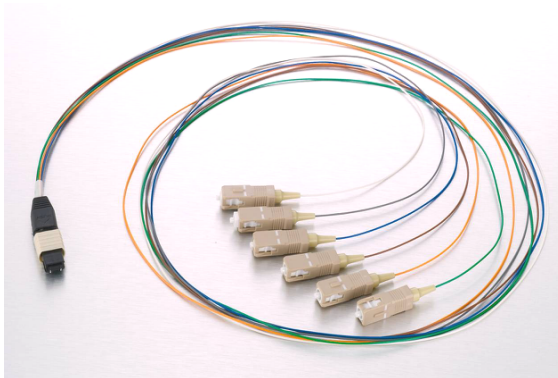
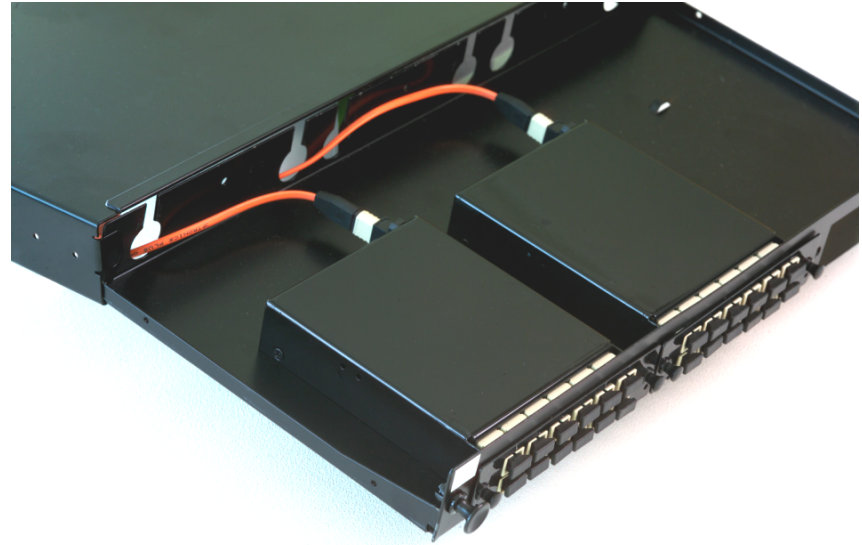
Option C

Konektor pro 400GBASE-SR16

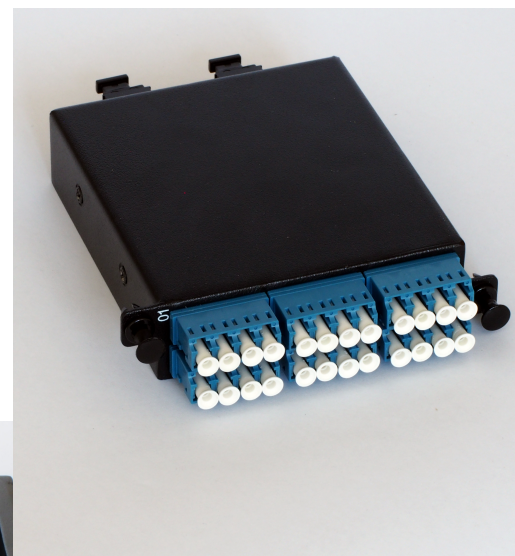
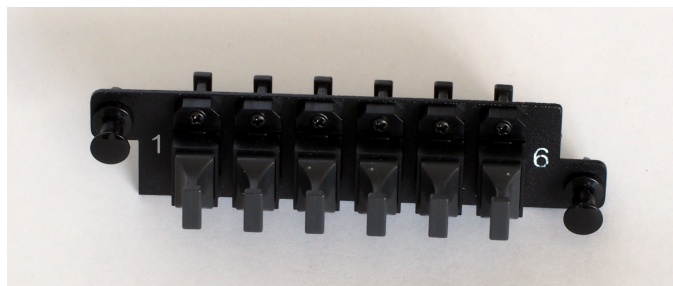
- MPO-16 konektor ANSI/TIA-604-1
- Konektor MPO/MTP 2x 16 vláken
- Konektor MXP



MPO / MTP moduly LGX formát

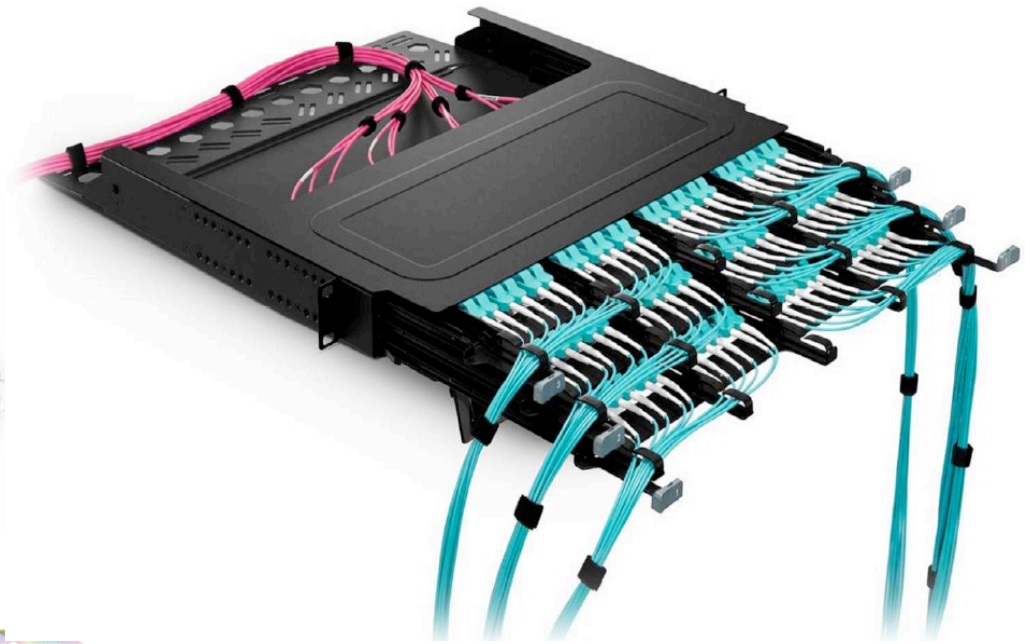


UHD rozvaděče s MPO/MTP

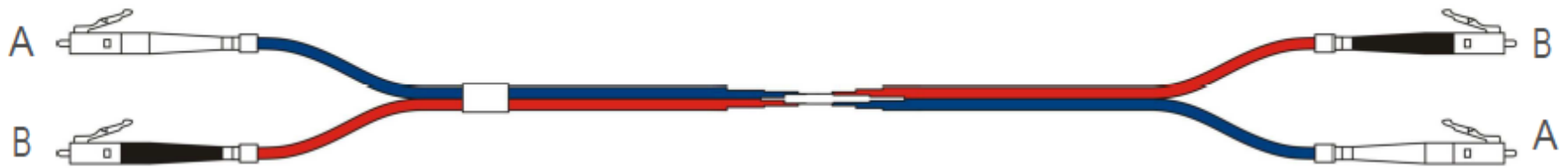


MPO / MTP HD kazety

- 12 x LC konektor na 1 x MPO konektor
- Verze SM, OM3, OM4
- 12 kazet v šasi 1U 19"
- 144 konektorů LC /1U
- Možnost výměny zepředu /zezadu šasi



Polarita LC duplex



A-to-A Patch Cord

Figure 1



A-to-B Patch Cord

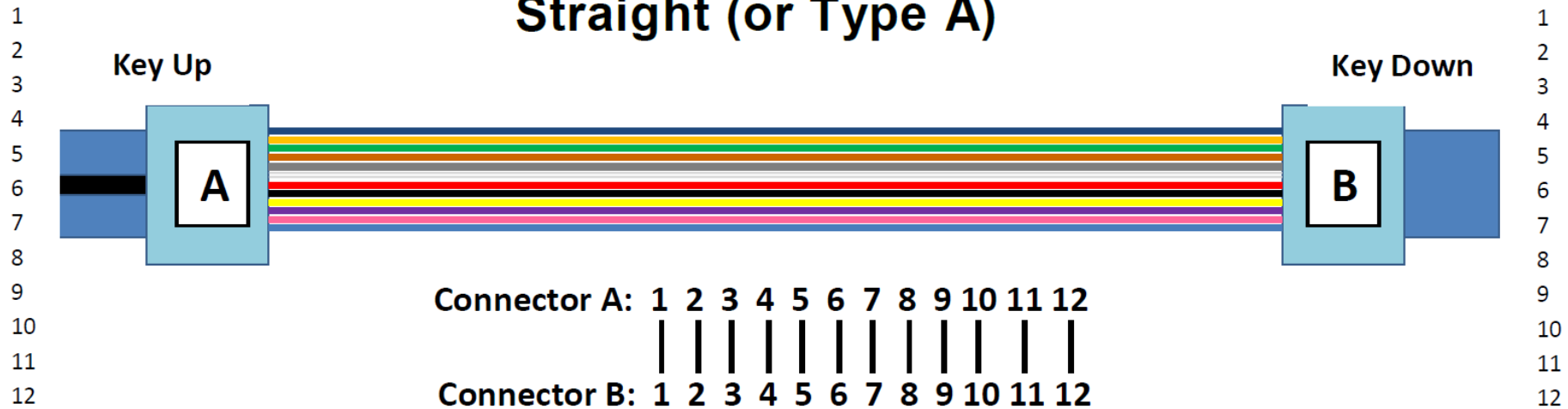
Figure 2

Polarita zapojení MPO konektorů

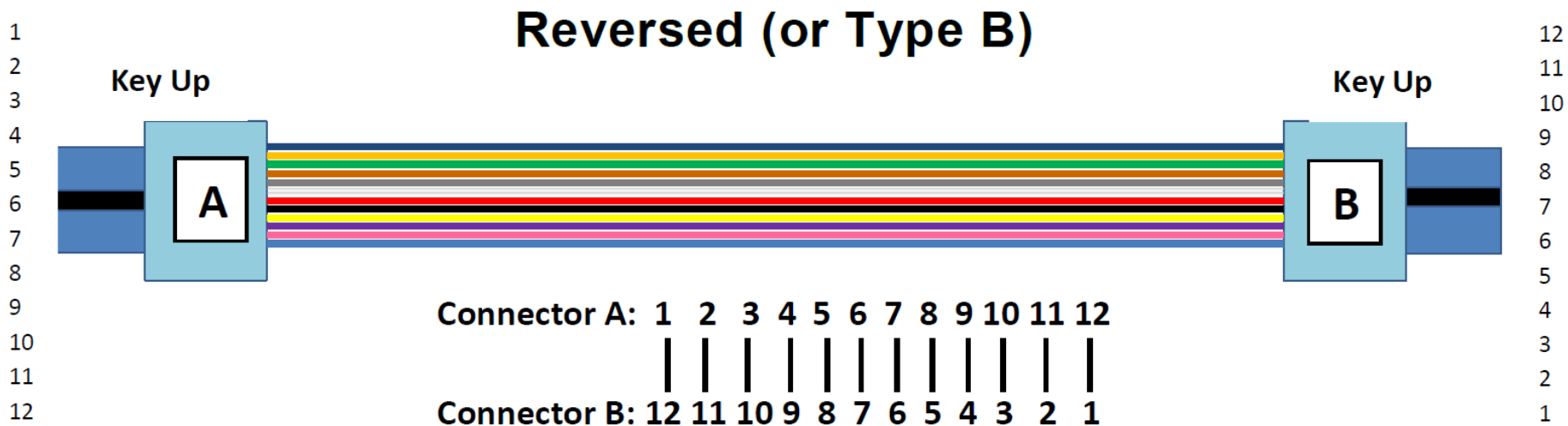
- **Definováno TIA-568-C a TIA-568-D**
- **Metoda A**
 - Páteřní kabel zapojen A-A Key Up – Key Down (pin 1 = pin 1)
 - Spojka typ A (Key Up – Key Down)
 - Patchkordy na koncích linky – **jeden A-A, druhý A-B**
- **Metoda B**
 - Páteřní kabel **křížený** = zapojen A-B Key Up – Key Up (pin 1 = pin 12)
 - Spojka typ B (Key Up – Key Up)
 - Patchkordy na koncích linky – **oba A-B**
 - Není možné použít SM APC konektory
- **Metoda C**
 - Páteřní kabel křížené páry = zapojen A-A Key Up – Key Down (pin 1 = pin 2)
 - Spojka typ A (Key Up – Key Down)
 - Patchkordy na koncích linky – oba A-B
 - <http://www.cables-solutions.com/category/fiber-optic-patch-cables/mpomtp-solutions>

Kabel MPO 12 vláken typ A (A-A)

Straight (or Type A)

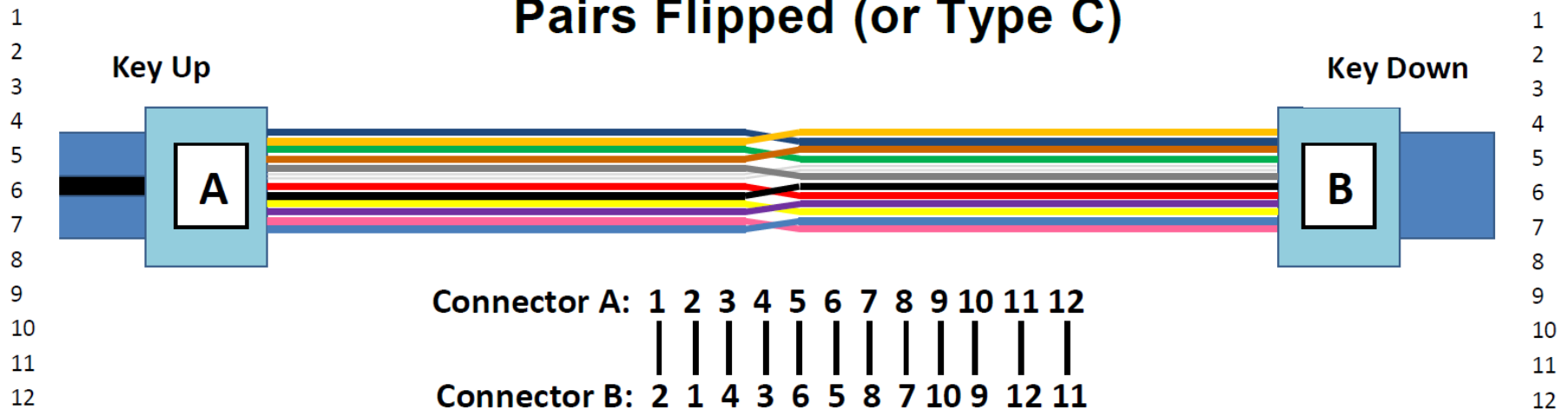


Kabel MPO 12 vláken typ B (A-B)

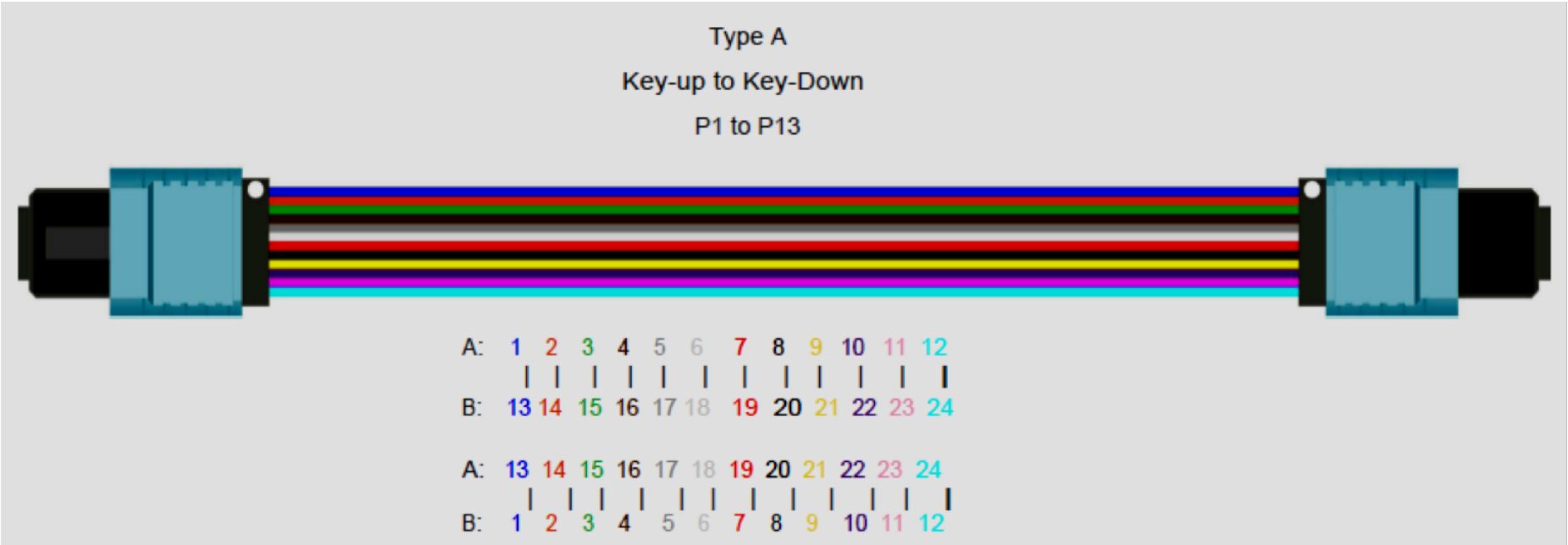


Kabel MPO 12 vláken typ C

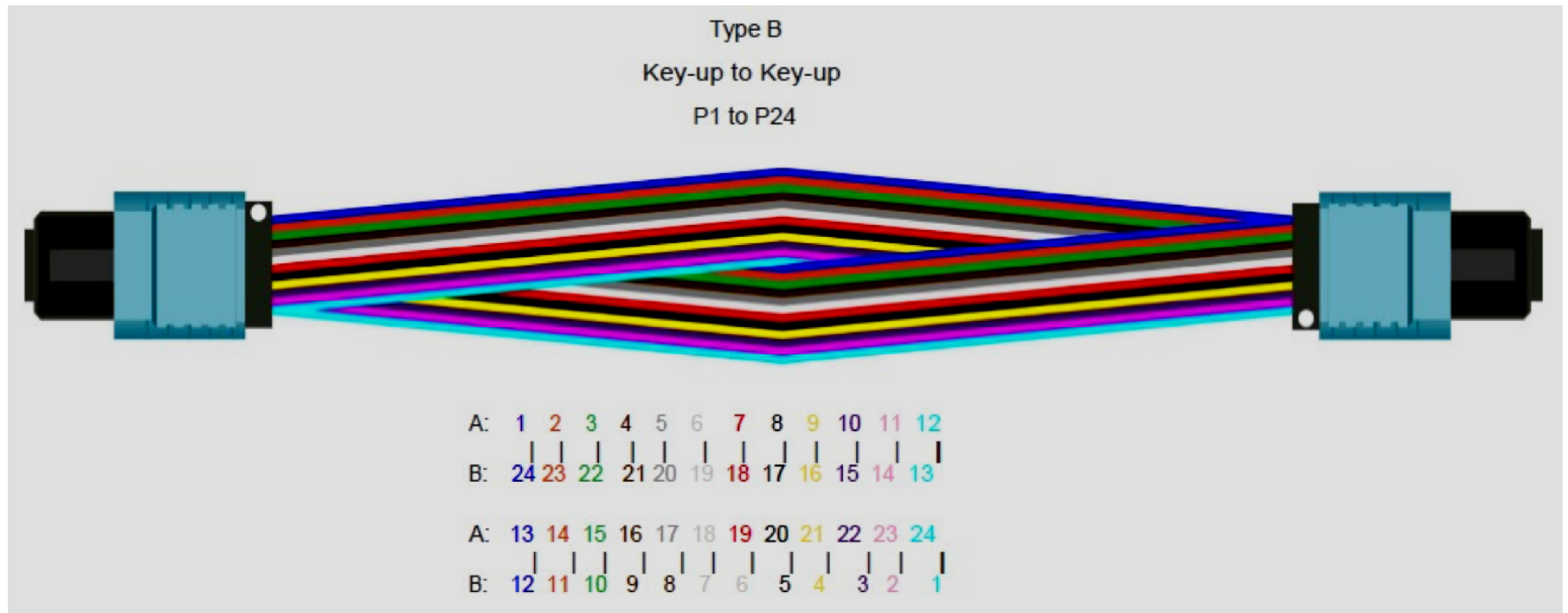
Pairs Flipped (or Type C)



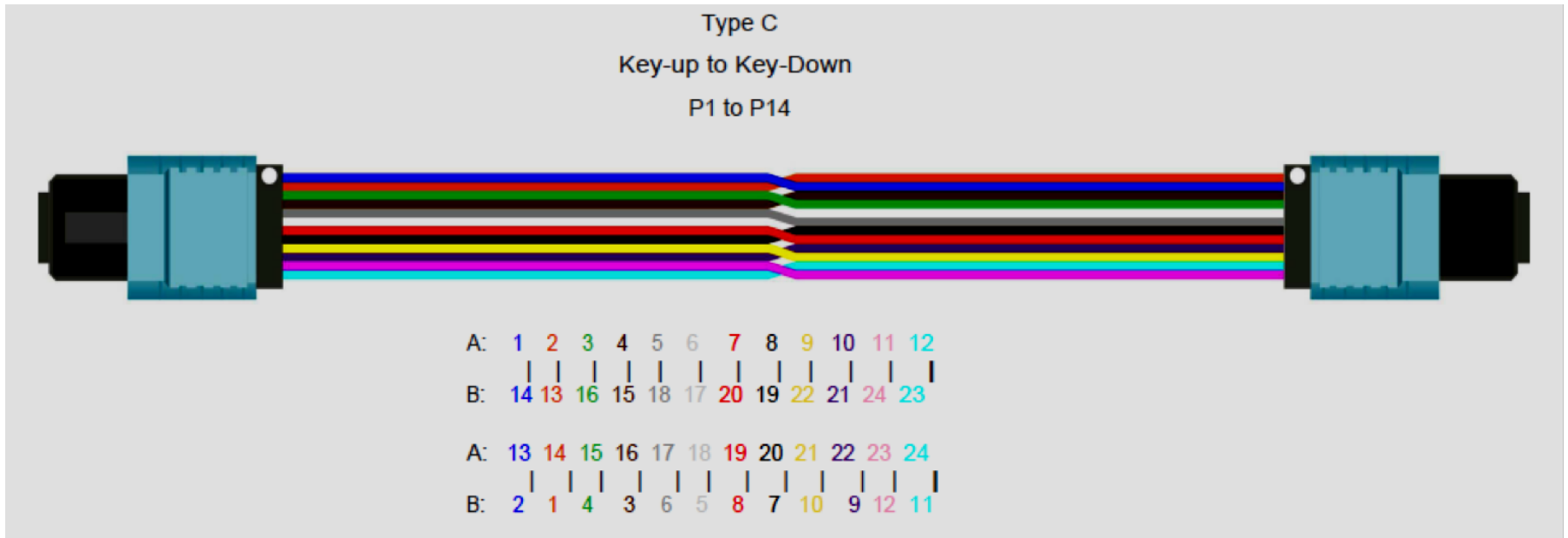
Kabel MPO 24 vláken typ A (A-A)



Kabel MPO 24 vláken typ B (A-B)

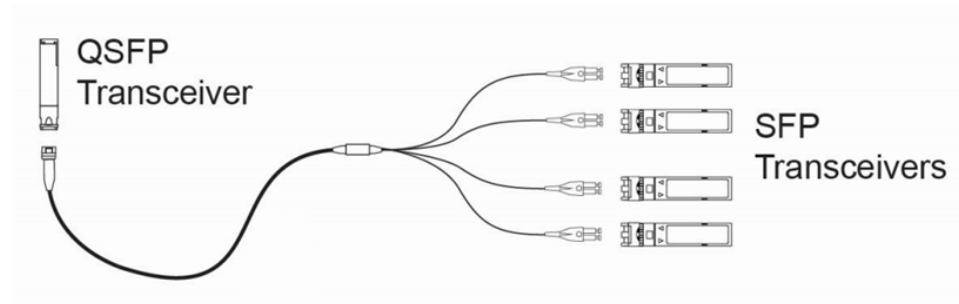
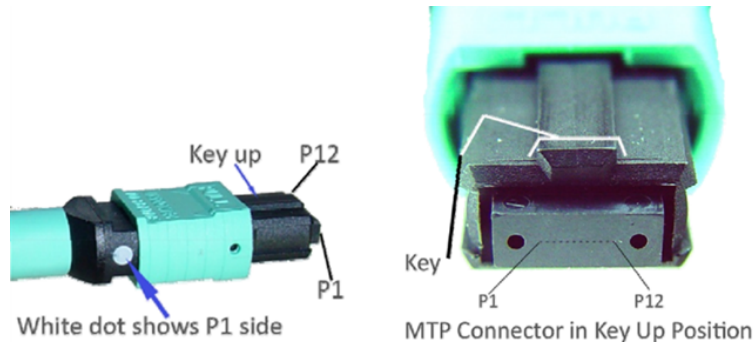


Kabel MPO 24 vláken typ C



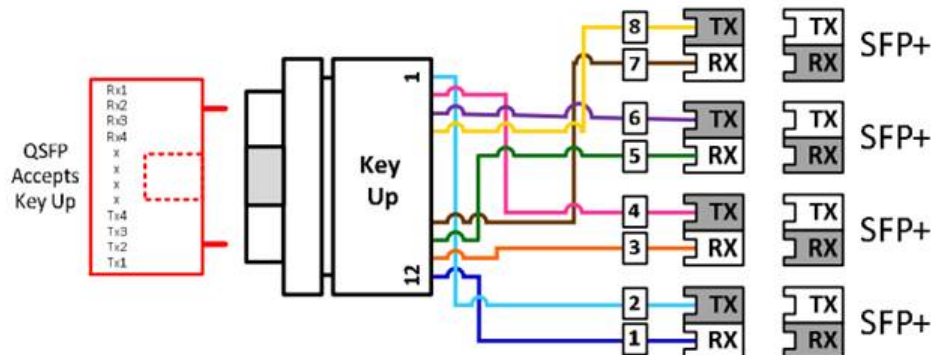
Hydra 40G na 4x10G

- Propojovací kabel MPO 12 female – 4x LC duplex
- Polarita typu B



Klasické zapojení pro Polaritu A (key UP), čísla vláken v LC duplex konektorech

| | |
|-----------|------|
| První LC | 12+1 |
| Druhé LC | 11+2 |
| Třetí LC | 10+3 |
| Čtvrté LC | 9+4 |



Pozvánka na školení

Optické sítě v DataCentrech 40/100/200 Gbit/s a jejich měření

22. 11. 2018

Email: sima@rlc.cz