

CWDM

- Passive optical multiplexer/de-multiplexer.
- Increases the capacity of existing networks by transferring several wavelengths on the same fibre.
- Independent of protocol and bitrate.
- Delivered in several combinations from 4 to 18 channel CWDM.



Description

The CWDM is delivered as 1U panel or as modules for 1U/3U modular panel. They are based on reliable passive technology and are delivered with SC or LC interface with PC or APC polished connectors.

Modules

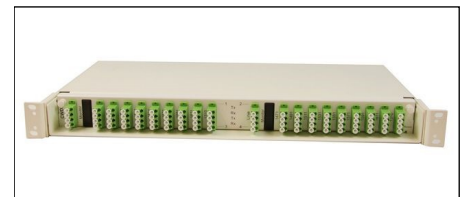
The modules are inserted in a 1U or 3U panel (see separate data sheet for details). The 3U panel may be populated with up to 12 modules, the 1U panel with up to 3 modules, and they may be placed in any order in the panel. This ensures a flexible and modular system with simple access to adding modules at a later stage and also offers high density with the panel fully equipped. Each module is complete with components for two-way communication, terminated in LC connectors at the front. The panel is intended for mounting in 19" racks.



3U modular panel with CWDM modules

1U panel

This is a panel for mounting in 19" or metric racks. The panel may offer high density, but do not offer any good possibilities for later expansion within the same panel. Each panel is complete with components for two-way communication, terminated in SC or LC connectors at the front.



1U panel with 4x8+1 channels

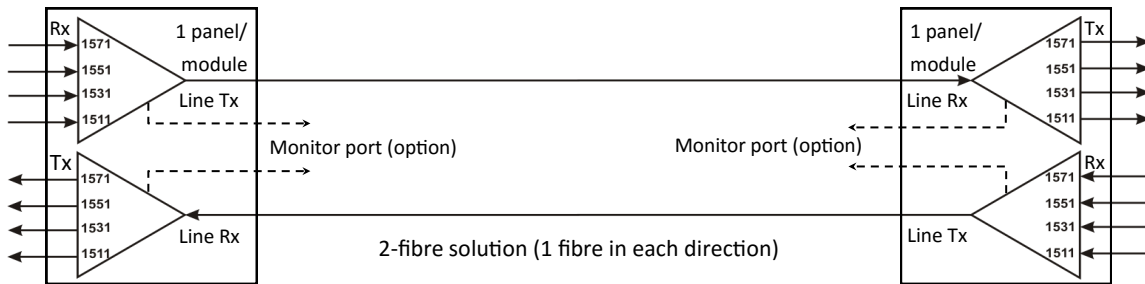
The panel is ready to be installed in 19" racks. By turning the mounting bracket it may also be installed in a metric rack. When the panel is to be placed in a 19" rack the bracket may be moved about 2 cm forward if needed. In this way the panel moves 2 cm further back in the rack. This gives more room in front of the panel, which may be beneficial for instance if the distance to the rack door is short.

System description

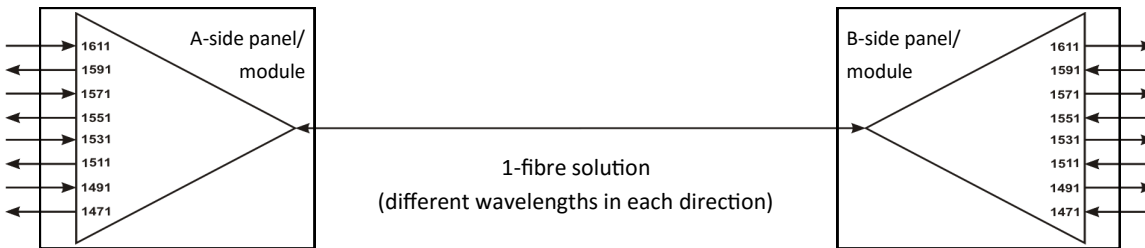
Passive CWDM panels/modules are a reliable and reasonable method for transferring several wavelengths/signals over the same fibre (wavelength multiplexing). In this way you may increase the capacity of existing fibre-cable significantly. Combined with OADM you may add or drop wavelengths on the way between the end points. A big advantage of using passive wavelength multiplexing is also that the method is protocol- and bitrate independent.

A complete system with components for two-way communication (multiplexer and de-multiplexer) in both ends are made with two panels/modules.

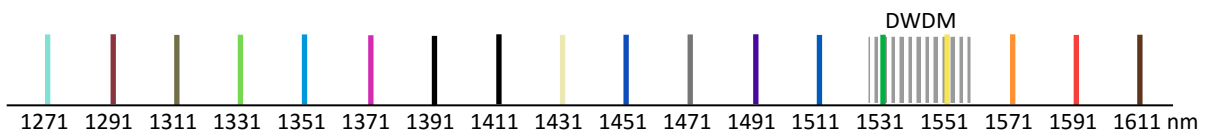
The standard way of using these units are in a 2-fibre solution where 1 fibre is used in each direction. The panels/modules are identical on both sides of the transfer line as shown in the illustration below. Some types may also be delivered with a monitor port (on both Tx and Rx as shown with dashed lines in the figure). Here 2% of the line signal is tapped off to enable monitoring without disturbing the traffic.



If only one fibre is available for transferring you may use different wavelengths in the Tx and the Rx direction. E.g. you may use 8 wavelengths to transfer 4 wavelengths in each direction. As this solution demands different panels/modules on each side of the cable you must order a A-side and a B-side as shown on the illustration below.

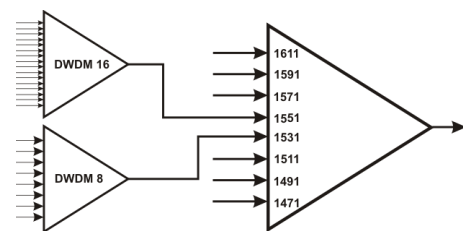


The figure below illustrates the available wavelengths in a standard CWDM system and also how the DWDM wavelengths fit in.



The units may also be delivered with an 1310 nm channel (+/-50 nm) that is multiplexed with some of the CWDM channels. This is used where you want to combine CWDM with a standard 1310 channel.

The CWDM system may also be upgraded by adding DWDM channels. The DWDM channels 50 - 61* may be multiplexed/de-multiplexed on to the 1531 CWDM channel and the DWDM channels 25 - 41* to the 1551 CWDM channel. We offer several types of DWDM components with 8 or 16 channels.



* Typically 8 channels (e.g. 54-61) is used on 1531 and 16 channels (e.g. 25-32 + 34-41) is used on 1551.

Specifications

Dimensions (HxWxD):	panel:	44 x 484 (19") x 240 mm	
	module:	130 x 35 x 210 mm	
Weight:	panel:	Ca. 2 kg	depending on equipment
	module:	0,2 - 0,5 kg	depending on equipment
Operating temperature:		-40 °C to 85 °C	
Insertion loss*:	4 channel (all types):	< 3.4 dB	< 2.9 dB typically
	4 channel/1310:	< 3.4/3.4 dB	< 2.9/2.9 dB typically
	4 channel/2xUpgrade:	< 3.4/3.4 dB	< 2.9/2.9 dB typically
	8 channel:	< 3.6 dB	< 3.0 dB typically
	8L(lower band):	< 3.8 dB	< 3.1 dB typically
	8 channel/WB:	< 3.6/3.6 dB	< 3.0/3.0 dB typically
	8 channel/WB + Monitor:	< 4.1/4.1 dB	< 3.5/3.5 dB typically
	18 channel:	< 4.6 dB	< 4.0 dB typically

* Loss over a system (2 panels and 4 connector-pairs)

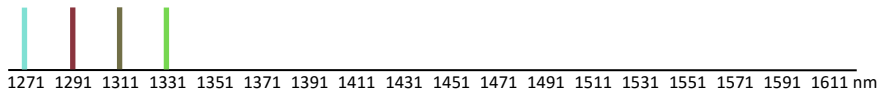
Wavelength:	4 channel:	1511, 1531, 1551, 1571 or 1471, 1491, 1591, 1611 or 1271, 1291, 1311, 1331 nm
(according to ITU-T G.694.2)	8 channel:	1471, 1491, 1511, 1531, 1551, 1571, 1591, 1611 or 1271, 1291, 1311, 1331, 1351, 1371, 1431, 1451 nm
	18 channel:	1271, 1291, 1311, 1331, 1351, 1371, 1391, 1411, 1431, 1451, 1471, 1491, 1511, 1531, 1551, 1571, 1591 and 1611 nm
Pass band:	CWDM channels:	+/- 6.5 nm
	1310 nm:	+/- 50 nm
	Upgrade 1/WB:	1260-1458 nm
	Upgrade 2:	1504-1577 nm
Monitor output (where available):		17 dB below the line signal (2%)

Overview of the CWDM units

4 channel CWDM - lower band

FPM76-4LCWDM 4 channel CWDM, 1271-1331

FP65-4LCWDM 4 channel CWDM, 1271-1331
 FP65-2x4LCWDM 2 x 4 channel CWDM, 1271-1331

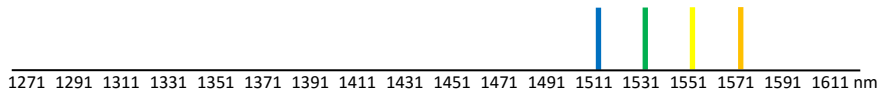


FPM76-4LCWDM
 FP65-4LCWDM

4 channel CWDM

FPM76-4CWDM 4 channel CWDM, 1511-1571

FP65-2x4CWDM 2x4 channel CWDM, 1511-1571
 FP65-4CWDM 4 channel CWDM, 1511-1571

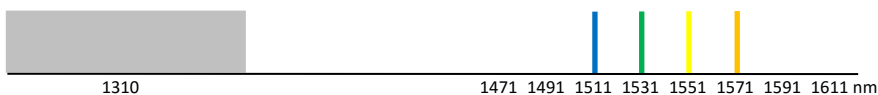


FPM76-4CWDM
 FP65-4CWDM

4 channel CWDM + 1310

FPM76-4-1CWDM 4+1 channel CWDM, 1511-1571 + 1310

FP65-4-1CWDM 4+1 channel CWDM, 1511-1571 + 1310
 FP65-2x4-1CWDM 2x4+1 channel CWDM, 1511-1571 + 1310

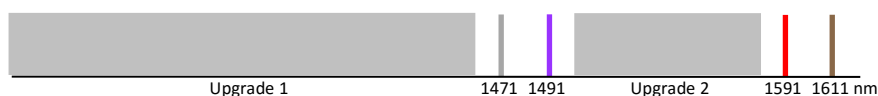


FPM76-4-1CWDM
 FP65-2x4-1CWDM

4 channel CWDM + 2 upgrade

FPM76-4-2CWDM 4+2 channel CWDM, 1471/1491-1591/1611 + 2xUpgrade

FP65-2x4-2CWDM 2 x 4+2 ch. CWDM, 1471/1491-1591/1611 + 2xUpgrade
 FP65-4-2CWDM 4+2 channel CWDM, 1471/1491-1591/1611 + 2xUpgrade



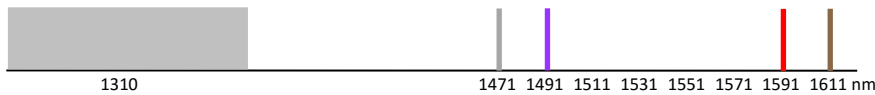
FPM76-4-2CWDM
 FP65-4-2CWDM

Overview of the CWDM units cont.

4U channel CWDM + 1310

FPM76-4U-1CWDM 4+1 channel CWDM, 47/49/59/61/31

FP65-4U-1CWDM 4+1 channel CWDM, 31/47/49/59/61
 FP65-2x4U-1CWDM 2 x 4+1 channel CWDM, 31/47/49/59/61

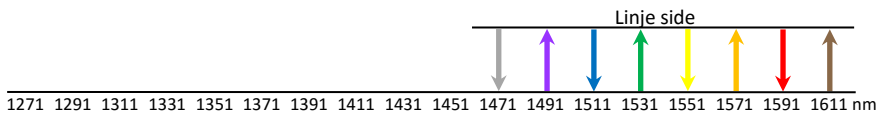


FPM76-4U-1CWDM
 FP65-2x4U-1CWDM

1-fibre 4 channel - A side

FPM76-4-8CWDM-A 4 channel CWDM, 1-fibre, A side

FP65-4-8CWDM-A 4 channel CWDM, 1-fibre, A side

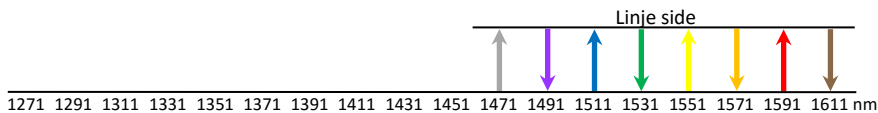


FPM76-4-8CWDM-A
 FP65-4-8CWDM-A

1-fibre 4 channel - B side

FPM76-4-8CWDM-B 4 channel CWDM, 1-fibre, B side

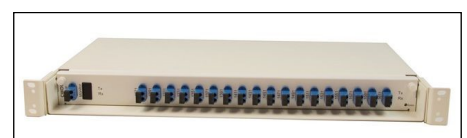
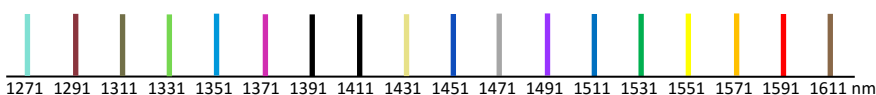
FP65-4-8CWDM-B 4 channel CWDM, 1-fibre, B side



FPM76-4-8CWDM-B
 FP65-4-8CWDM-B

18 channel CWDM

FP65-18CWDM 18 channel CWDM, 1271-1611



FP65-18CWDM

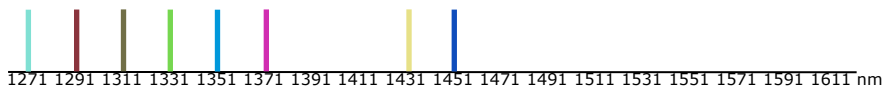
Overview of the CWDM units cont.

8 channel CWDM - lower band, A

FPM76-8LCWDM-A 8 channel CWDM, 1271-1451



FP65-8LCWDM-A 8 channel CWDM, 1271-1451



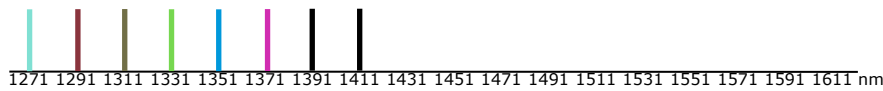
FPM76-8LCWDM-A
FP65-8LCWDM-A

8 channel CWDM - lower band, B

FPM76-8LCWDM-B 8 channel CWDM, 1271-1411



FP65-8LCWDM-B 8 channel CWDM, 1271-1411



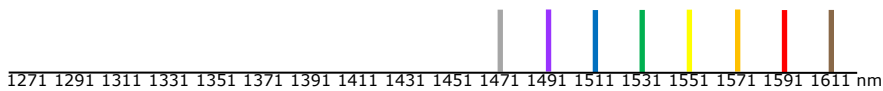
FPM76-8LCWDM-B
FP65-8LCWDM-B

8 channel CWDM

FPM76-8CWDM 8 channel CWDM, 1471-1611



FP65-8CWDM 8 channel CWDM, 1471-1611
FP65-2x8CWDM 2x8 channel CWDM, 1471-1611
FP65-4x8CWDM 4x8 channel CWDM, 1471-1611



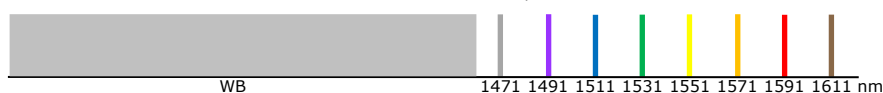
FPM76-8CWDM
FP65-8CWDM

8 channel CWDM + WB

FPM76-8-WB-CWDM 8+1 channel CWDM, 1471-1611 + 1260-1458
FPM76-8-WB-CWDM-M 8+1 channel CWDM, 1471-1611 + 1260-1458 + Monitor



FP65-8-WB-CWDM 8+1 channel CWDM, 1471-1611 + 1260-1458
FP65-8-WB-CWDM-M 8+1 channel CWDM, 1471-1611 + 1260-1458 + Monitor
FP65-2x8-WB-CWDM 2x8+1 channel CWDM, 1471-1611 + 1260-1458
FP65-4x8-WB-CWDM 4x8+1 channel CWDM, 1471-1611 + 1260-1458



FPM76-8-WB-CWDM
FP65-4x8-WB-CWDM

Article numbers

CWDM may also be delivered in other units like Modular panel, DIN
- see DB4157

Or in cassettes in splice boxes
- see DB4138

1U Panel:

4 channel:

FP65-4LCWDM-Sxxx	4 channel CWDM, SM, 1271-1331, xxx
FP65-2x4LCWDM-Sxxx	2 x 4 channel CWDM, SM, 1271-1331, xxx
FP65-4CWDM-Sxxx	4 channel CWDM, SM, 1511-1571, xxx
FP65-2x4CWDM-Sxxx	2 x 4 channel CWDM, SM, 1511-1571, xxx
FP65-4-1CWDM-Sxxx	4+1 channel CWDM, SM,1511-1571/1310, xxx
FP65-2x4-1CWDM-Sxxx	2 x 4+1 channel CWDM, SM,1511-1571/1310, xxx
FP65-4U-1CWDM-Sxxx	4+1 channel CWDM, SM, 31/47/49/59/61, xxx
FP65-2x4U-1CWDM-Sxxx	2 x 4+1 channel CWDM, SM, 31/47/49/59/61, xxx
FP65-2x4-2CWDM-Sxxx	2 x 4+2 channel CWDM, 1471/1491-1591/1611 + 2 x Upgrade, xxx
FP65-4-2CWDM-Sxxx	4+2 channel CWDM, 1471/1491-1591/1611 + 2 x Upgrade, xxx

8 channel:

FP65-8LCWDM-A-Sxxx	8 channel CWDM, SM, 1271-1451, xxx
FP65-8LCWDM-B-Sxxx	8 channel CWDM, SM, 1271-1411, xxx
FP65-8CWDM-Sxxx	8 channel CWDM, SM, 1471-1611, xxx
FP65-2x8CWDM-SLC	2x8 channel CWDM, SM, 1471-1611,LC
FP65-4x8CWDM-SLC	4x8 channel CWDM, SM, 1471-1611,LC
FP65-8-WB-CWDM-Sxxx	8+1 channel CWDM, SM, 1471-1611/1260-1458, xxx
FP65-2x8-WB-CWDM-SLC	2 x 8+1 channel CWDM, SM, 1471-1611/1260-1458, LC
FP65-4x8-WB-CWDM-SLC	4 x 8+1 channel CWDM, SM, 1471-1611/1260-1458, LC
FP65-8-WB-CWDM-Sxxx-B	8+1 channel CWDM, SM, 1471-1611/1260-1458 + Monitor port, xxx

18 channel:

FP65-18CWDM-Sxxx	18 channel CWDM, SM, 1271-1611, xxx
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Single fibre:

FP65-4-8CWDM-Sxxx-A	4 channel CWDM, SM, 1-fibre, xxx, A side
FP65-4-8CWDM-Sxxx-B	4 channel CWDM, SM, 1-fibre, xxx, B side
FP65-9-18CWDM-Sxxx-A	9 channel CWDM, SM, 1-fibre, xxx, A side
FP65-9-18CWDM-Sxxx-B	9 channel CWDM, SM, 1-fibre, xxx, B side

xxx = connector type in front of the panel:

SC	=	SC/PC
SCA	=	SC/APC
LC	=	LC/PC
LCA	=	LC/APC

Modules:

4 channel:

FPM76-4LCWDM-Sxxx	Module, 4 channel CWDM, SM, 1271-1331, xxx	1-slot
FPM76-4CWDM-Sxxx	Module, 4 channel CWDM, SM, 1511-1571, xxx	1-slot
FPM76-4-1CWDM-Sxxx	Module, 4+1 channel CWDM, SM,1511-1571/1310, xxx	1-slot
FPM76-4U-1CWDM-Sxxx	Module, 4+1 channel CWDM, SM,47/49/59/61/31, xxx	1-slot
FPM76-4-2CWDM-Sxxx	Modul, 4+2 channel CWDM, 1471/1491-1591/1611 + 2 x Upgrade, xxx	1-slot

8 channel:

FPM76-8LCWDM-A-Sxxx	Module, 8 channel CWDM, SM, 1271-1451, xxx	1-slot
FPM76-8LCWDM-B-Sxxx	Module, 8 channel CWDM, SM, 1271-1411, xxx	1-slot
FPM76-8CWDM-Sxxx	Module, 8 channel CWDM, SM, 1471-1611, xxx	1-slot
FPM76-8-WB-CWDM-Sxxx	Module, 8+1 channel CWDM, SM, 1471-1611/1260-1458, xxx	1-slot
FPM76-8-WB-CWDM-Sxxx-M	Module, 8+1 channel CWDM, 1471-1611 + 1260-1458 + Monitor port, xxx	1-slot

18 channel:

FPM76-18CWDM-Sxxx	Module, 18 channel CWDM, SM, 1271-1611, xxx	2-slot
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Single fibre:

FPM76-4-8CWDM-Sxxx-A	Module, 4 channel CWDM, SM, 1-fibre, xxx, A side	1-slot
FPM76-4-8CWDM-Sxxx-B	Module, 4 channel CWDM, SM, 1-fibre, xxx, B side	1-slot
FPM76-9-18CWDM-Sxxx-A	Module, 9 channel CWDM, SM, 1-fibre, xxx, A side	2-slot
FPM76-9-18CWDM-Sxxx-B	Module, 9 channel CWDM, SM, 1-fibre, xxx, B side	2-slot

xxx = connector type in front of the module:

LC	=	LC/PC
LCA	=	LC/APC

Other combinations of both the 1U panel and the modules may be available on request.

Accessories

FP70301	Cable guide, 0,5U
FP70361	Cable guide, 1U
FP70325	Storage unit, 2U
02-NCD513	Cable guide II
FP70333	Cover, 3U
FP70334	Cover, 4U

Only for modules:

FPM76100	Panel, modular, 12-slot, 3U
FPM76105	Panel, modular, 3-slot, 1U
FPM76106	Lid, 1U panel
FPM76190	Blanking plate, 1-slot