DFO012: FIBER UNWINDER EXCESS-LENGTH CONTROL SYSTEM

DFO012 with new real time EFL monitoring application for up to 96 fibres simultaneously

For the production of «**FIST**» cables (**F**ibre **I**n **S**teel **T**ube), where a stainless steel tube is required to protect the internal optical fibres against environmental influences, one abbreviation in particular stands out: «EFL».

«**EFL**» stands for **E**xcess **F**ibre **L**ength and refers to the excess length of the inner optical fibres compared to the outer metal tube length.

The EFL is decisive for the area of application of the cable and must therefore be exactly reproducible in a production process.

Why EFL monitoring is key in modern FIST production lines:

Every material has its own thermal coefficient, and this also applies to a fibre in a metal tube.

With fluctuating temperatures (summer/winter), the stainless steel pipe expands more than the fibre. If the fibre length inside the tube is exactly the same as the length of the metal tube, the tension would reach a range where the fibre would be unusable due to the extreme tensile load, which could even cause the fibre to break.

To counteract this effect, a longer length of fibre is placed inside the metal tube, which can be precisely controlled during production to compensate for the thermal expansion of the tube.

The real time EFL monitoring allows the inline quality control of this important value, especially for cables with a very high quantity of fibres.

THE is the only company worldwide building entire FIST production lines, containing precision fibre unwinding, endless stainless steel tape supply, fibre bundling, stainless steel tube forming and laser welding, steel tube draw down and precise winding on drums.

These FIST and OPGW lines, completely designed and built under one roof, show very good performances in both, quality and productivity.

The DFO precision fibre unwinder units consist of 12 unwinding cassettes per unit, up to 8 units/96 fibres can be integrated into a FIST line.

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The EFL real time monitoring application measures the total length of each fibre in relation to the stainless steel tube length:

Moteur	Etat moteur	Vitesse	Pos. Pantin	Surlongueur Total	Surlongueur mm/10 m	Courant	Couple	Long. Fibre	Etat Fibre
1 motor	En Fonction	30,11 m/min	45,25 %	+20,20 m	+25 mm	10,45 %	34,45 %	8020,20 m	OK
2 motor	En Fonction	29,99 m/min	50,06 %	+31,47 m	+31 mm	10,22 %	34,24 %	8031,47 m	OK
3 motor	En Fonction	30,13 m/min	47,87 %	+33,55 m	+32 mm	10,46 %	35,11 %	8033,55 m	OK
4 motor	En Fonction	29,92 m/min	52,84 %	+22,41 m	+26 mm	10,20 %	33,25 %	8022,41 m	OK
5 motor	En Fonction	29,96 m/min	51,46 %	+28,98 m	+29 mm	10,25 %	34,29 %	8028,98 m	OK
6 motor	En Fonction	29,97 m/min	50,42 %	+24,45 m	+27 mm	10,27 %	33,98 %	8024,45 m	OK
7 motor	En Fonction	30,19 m/min	42,34 %	+23,82 m	+27 mm	9,98 %	32,84 %	8023,82 m	OK
8 motor	En Fonction	29,98 m/min	51,11 %	+30,12 m	+30 mm	10,01 %	33,60 %	8030,12 m	OK
9 motor	En Fonction	29,91 m/min	53,88 %	+21,17 m	+26 mm	9,84 %	33,48 %	8021,17 m	OK
10 motor	En Fonction	30,12 m/min	49,20 %	+34,55 m	+34 mm	10,11 %	34,18 %	8034,55 m	OK
11 motor	En Fonction	29,99 m/min	50,11 %	+20,69 m	+25 mm	10,00 %	33,98 %	8020,69 m	OK
12 motor	En Fonction	30,04 m/min	49,60 %	+26,51 m	+28 mm	9,92 %	34,12 %	8026,51 m	OK

A further added value for high fibre quantities is the calculation of the average EFL of the entire cable construction of all fibres from all DFO units:

Total view on real time fiber excess length monitoring application

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Technical data

- **Spool diameter:** up to 405 mm
- **Spool width:** up to 260 mm
- **Spool fixation:** fast shaft fixing system
- **Fibre tension:** 10 g to 150 g +/- 3 g *(other tension range on request)*
- **Motorization:** Servo with precision gearbox
- **Guiding rollers:** Aluminium anodized with V-shape and friction reduced ball-bearings
- **Standard DFO:** 12 unwinding cassettes
- **Options:** customized number of cassettes from 3 to 15 unwinding stations per DFO unit, mobile units on rollers, Plug&Play options for use in different FIST lines, top lights, etc.