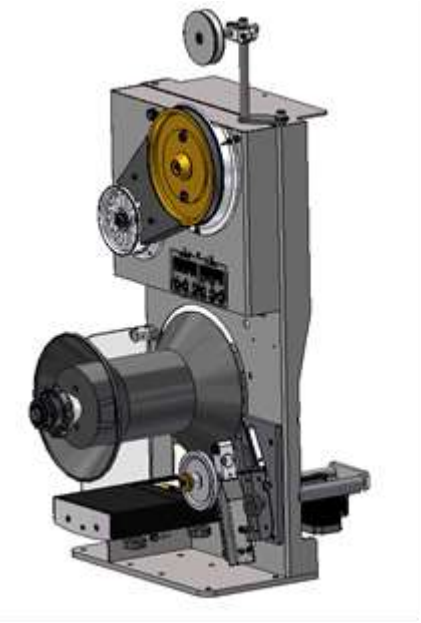
Data sheet **Spooling plant type SM33 modular**

1. General

Scope of supply	1 spooling plant with a total of 20 spooling modules
Brief technical description	Spooling plant with 20 off single take up spooling modules SM33w



Spooling plant consisting of several independent take up modules, arranged on a table. Modules grouped back to back.

Take up modules equipped with:

- Direct drive of the capstan via stepping motor
- spreader disc for wire separation
- spool traversing units driven by stepping motor via tooth belt
- spooling tension controlled by tension-measurement device at the guiding pulley
- Spooler shaft dia 16 mm (0.63”)
- driven by DC-servo drive

Module frame	metal sheet structure made of mild steel Single module size (w/h): 400/693 mm (15.75”/17.28”)
Machine frame	welded construction from mild steel square pipes ; height 460 mm (18.11”)
Layout	as per drawing #5.1

2. Production parameters

Wire material	stainless steel (e.g. 1.4301; 1.4401; 304; 316)
Wire diameter range	.0027” - 0.010” (= 0.068 mm – 0.254 mm)
Take up Type	SM33w modular
Spooling tension	20-400 cN (grams) <u>Note</u>: the spooling tension is dependent from the spool diameter: smaller spool diameter enables a higher spooling tension
Spooler shaft Ø	16 mm (= 0.63”)
Max. winding speed	180 m/min (600 fpm)
regulating range	1:10

Note: The winding speed is a theoretical machine value; the actual winding speed depends on many parameters which cannot be influenced by the machine (spool quality, spooling behaviour of the wire, annealing behaviour, temperature etc.) and must be determined empirically. Basically, the maximum speed is related to the winding tension: lower tension enables a higher speed

Spool range

	Spool Table	Flange		Core		Bore		Width		Traverse	
#	Name	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm
1	DIN100	4.10	100.0	2.58	63.0	0.63	16.0	3.94	100.0	3.15	80.0
2	DIN125	5.12	125.0	3.28	80.0	0.63	16.0	5.12	125.0	4.10	100.0
3	SC 4-1/2"x3"x2-1/2"	4.5	114.3	2.5	63.5	0.64	16.3	3.5	88.9	3	76.2
4	Pf 4-7/8"x3-1/2"x3"	4.86	123.4	3	76.2	0.64	16.1	4	101.6	3.5	88.9
5	SC 6"x3-1/2"x3-1/2"	6	152.4	3.5	88.9	0.63	16.0	4.32	109.6	3.5	88.9
6	DIN 160	6.3	160.0	3.94	100.0	0.63	16.0	5.04	128.0	6.3	160.0

Winding tension 20 - 400 cN

Note: the higher the tension set point, the lower is the achievable maximum speed. Also, the spool diameter plays a rule: smaller spools enables higher spooling tension

Note: The optimum rewind strength must be determined empirically by the operator. The operator is responsible for damages resulting from wrongly selected rewind strength.

3. Technical description of the spooling plant

No. of spooling heads 20

Arrangement of spooling heads 2 x 10 opposite

Drives of capstans stepping motors (make Nanotec);
motors, without brake and without separate fan;
motors controlled via power controller (make at our choice) ;
speed adjustment via Line-Front-Panel (LFP) or central PC;
speed indication at LFP

Drives of spools DC servo motors (make at our choice);
motors with temperature control;
Torque transmission to spool shaft via inductive clutch;

Spool shaft diameter 16 mm (0.63”) ; the spools are taken up onto shafts via exchangeable adaptors

Spool fastening via quick-change clamping cones (Uhing)

Adjustment of tension tension controlled spooler drive by means of tension measurement device with tension indication and tension regulation;

Spool-traversing traversing spool with automatically spool rim adjustment (without light barriers)

	The traverse unit is equipped with its own stepping motor, which generates the linear movement in reversing operation via a tooth belt. The traverse unit can be operated as common traverse unit with manual adjustment of the change-over points or with automatic traversing width control.
Operating mode “common traverse unit”	The basic adjustment of the traversing width is effected by selecting the spool type via the operating panel. Precision adjustment of the change-over points is affected via corrective values (+/- adjustment). Note: The optimum change-over time must be determined empirically by the customer by corrective input via the operating panel according to the operating parameters (wire speed, traversing speed, wire diameter, spool size etc.).
Operating mode “automatic traversing width control”	The basic adjustment of the traversing width is effected by selecting the spool type via the operating panel. The traversing width control is carried out with computer support according to a mathematical procedure evaluating various parameters. The main feature is to measure the wire package actual diameter at the rim and compare with the theoretical wire package diameter. Any deviation will activate a PLC control loop, which will change the corrective values of the change-over points accordingly.
Principle of traverse	traversing spool
Traverse	cylindrical spooling of standard-flange spools, incl. biconical spools
Traverse drive	Stepping motor (make at our choice) and tooth belt controlled via microcontroller (make at our choice) traversing step/speed continuously adjustable
Traverse pitch	max. ca. 4 - 5 x dmax Note: 1xd traversing (layer-to-layer winding) is not possible. Note: The traversing step can be electronically coupled with the number of revolutions of the spool shaft, thus achieving a nearly constant traversing step from the spool core up to the spool flange; the coupling deviation is ± 10 %. Operation with constant traversing speed is possible (traversing step increases with increasing filling ratio)

Pulleys and disks

Inlet pulley	by customer
Inlet pulley related to the spooling heads	Ø 76 mm (3”); polyamide; located in ball bearings
Deflection pulley	Ø 50 mm (2”); Aluminium with coating; located in ball bearings
Capstans	Ø 191 mm (7.52”); steel with chromium oxide coating
Spreader disk	Ø 110 mm (4.33”); Aluminium chromium oxide coating
Rubber pressure rolls	not included

4. Description of the electric control

Electric equipment	As per EN 60204T 1 for ambient temperatures of min. 5°C and max. 40°C, the average temperature not exceeding 35°C for a period of 24 h; altitude up to 1000 m MSL; max. adm. air humidity 90% related to 20°C and 50 % at 35°C. For other conditions, suitable additional measures will be required (extra price).
Electric components	make at our choice
Protection mode of electric control	IP 23
Mains voltage	3 x 480 V (+ 6 % / - 10 %) ; PE
Mains frequency	60 Hz +/- 2%
Transformer/neutral point generator	without
Control system	microcontroller card type VST4; prepared for RS232 interface
Operating and control elements	spooling plant: - main switch - control voltage reset button per take up module: Line-Front-Panel, for operation and indication of: - capstan ON/OFF - speed setpoint - speed indication (m/min) - wire length set point (km) - produced wire length by spool (km) - spool type selection (#) - traverse correction (+/-) - traverse speed setpoint - operation mode selection traverse (constant speed or constant pitch) - wire counter reset - alarm lamp „spool full“ - alarm lamp „line stop “ - error number indication NOTE: display units metric only!

Central PC	central industrial PC unit built into the main power supply switchboard; LED screen and keyboard; mouse; PC connected to all single microcontrollers by RS232 interface; software to display all values and setpoints necessary for the operation; selection of spool type and setpoints for wire speed and spooling tension per take up; trend display for wire tension of all connected lines; historical data stored onto the hard disc in ASCII format; Ethernet port for trend data upload to back office systems.

5. Miscellaneous

Paint	Machine RAL 9002 structural varnish (grey / white) Table RAL 7016 (anthracite grey)
Documentation	3-fold in English; manuals of the components (e.g. frequency converter) 1-fold
Machine illumination	LED lamp above spooling shaft

6. Layout