

Data sheet**Wire drawing machine 180 - 15
with inline annealer RI 120.2.R.N.070 make Niehoff
and automatic Spooler A 125 - 250****specialized for EDM wire****1. General**

Scope of supply

1 off

- EDM-wire drawing machine 180 - 15
- Inline annealer RI 120.2.R.N.070 make Niehoff
- Automatic spooler A 125-250

Brief technical description

**drawing machine 180 - 15**

Two-cone pair single-chamber single-wire plunger drawing machine with integrated, water-cooled dry capstan;

Arrangement of cone pairs vertically;

S – deviation between the cone pairs;

drawing cones and drawing dies fully submerged in drawing agent;

drawing machine dancer-controlled; weight-operated dancer compensator integrated into drawing machine; master capstan is located in the automatic spooler;

connection to central drawing agent supply system

➔ **Two (2) independent supplies for the drawing agent are required**

- **Main circuit about 100 l/min – 1.5 bar**
- **Spraying circuit about 20 l/min – 6 bar**

Inline annealer RI 120.2.R.N.070 make Niehoff

Induction-conduction annealer (annealer with inductive energy input) and thermal reheating;

with by-pass wire guide (without assignment of the annealer) for hard-drawn wire;

self-contained coolant supply system, filter, heat exchanger, tank and pumps

Automatic spooler A 125 - 250:

Single-wire automatic spooler consisting of dancer-regulated tailstock spindle spooler with device for the automatic feeding and take-off of the spools; with device for fastening the wire start to the spool to be wound by means of clamping and wrapping (reduced wire end); loose wire end on the wound spool; wire traverse unit with optical detection of the spool geometry at winding material level via light barriers and automatic traversing width correction suitable for spools with cylindrical flanges; with dancer unit; with spool magazine (capacity: 5 off full and empty spools each plus 1 spool in tailstock spindle so that 6 spools can be automatically wound); with wire accumulator (stationary and pivotable spreader disk in the wire inlet area of the automatic spooler); top spreader disk driven (master capstan)

Note: For changing the spool of the automatic spooler, the line must be at standstill, i.e. upon reaching the preselected number of meters, the automatic

spooler decelerates the complete line via a low-speed ramp down to standstill; then the full spool is replaced by an empty spool, the wire is fastened to the core and the complete line is accelerated again up to nominal speed via a high-speed ramp. The spool changing process takes about 120 s plus ramp times.

Wire pay-off device / wire pay-off stand:
not included / provided by the customer

Operating modes of the plant

Drawing and annealing	drawing, annealing, rewinding (annealed wire)
Drawing	drawing, rewinding (hard drawn wire) – with wire-by-pass inside the annealer

Layout acc. to drawing "Layout AN2017.00184"

2. Production parameters

Wire material	Cu blank; CuZn20 (MS80); CuZn37 (Ms63)
max. wire inlet diameter	1.2 mm
min. wire inlet diameter	0.8 mm
max. wire inlet strength	500 N/mm ²
min. finished wire diameter	0.20 mm
max. finished wire diameter	0.35 mm
Finished wire strength	
hard-drawn	250 - 1100 N/mm ²
annealed	140 - 550 N/mm ²
Drawing speed	max. 35 m/s
Speed limitations	
K 125	max. 22.5 m/s
Spool P 5	max. 28 m/s
K 160	max. 30 m/s
K 15	max. 32 m/s
Regulating range	1:5
min. production speed	7 m/s

Note: The indicated drawing speed is a theoretical machine value; the actually achievable drawing speed depends on various parameters which cannot be influenced by the machine (e.g. quality of dies, drawing media used, wire quality, spooling behavior of the wire, spool quality) and must be found out empirically.

average sound level approx. 85 dB(AS)

Note: The reference drawing speed for the sound level measurement is 35 m/s with an inlet-wire \varnothing of 0.8 mm. Prerequisite: optimized die set. Measuring point 1 m distance and 1.6 m high; plant in stand-alone operation.

2.1 Performance data of inline annealer

Wire range	Single wire: 0.20...0.35 mm		
Production speed			
Wire- $\varnothing = 0.20$ mm $A = 0.031$ mm ²	Material Cu CuZn20 CuZn37	$V_{max.} =$ $V_{max.} =$ $V_{max.} =$	35 m/s; Rm ~ 250 N/mm ² 35 m/s; Rm ~ 400 N/mm ² up to Rm ~ 480 N/mm ² 35 m/s; Rm ~ 440 N/mm ² up to Rm ~ 520 N/mm ² Rm > 950 N/mm ²
Wire- $\varnothing = 0.25$ mm $A = 0.049$ mm ²	Material Cu CuZn20 CuZn37	$V_{max.} =$ $V_{max.} =$ $V_{max.} =$	35 m/s; Rm ~ 250 N/mm ² 35 m/s; Rm ~ 400 N/mm ² up to Rm ~ 480 N/mm ² 35 m/s; Rm ~ 440 N/mm ² up to Rm ~ 520 N/mm ² Rm > 950 N/mm ²
Wire- $\varnothing = 0.30$ mm $A = 0.071$ mm ²	Material Cu CuZn20 CuZn37	$V_{max.} =$ $V_{max.} =$ $V_{max.} =$	35 m/s; Rm ~ 250 N/mm ² 34 m/s; Rm ~ 400 N/mm ² up to Rm ~ 480 N/mm ² 33 m/s; Rm ~ 440 N/mm ² up to Rm ~ 520 N/mm ² Rm > 950 N/mm ²
Wire- $\varnothing = 0.35$ mm $A = 0.092$ mm ²	Material Cu CuZn20 CuZn37	$V_{max.} =$ $V_{max.} =$ $V_{max.} =$	31 m/s; Rm ~ 250 N/mm ² 29 m/s; Rm ~ 400 N/mm ² up to Rm ~ 480 N/mm ² 28 m/s; Rm ~ 440 N/mm ² up to Rm ~ 520 N/mm ² Rm > 950 N/mm ²
The above mentioned efficiencies are theoretic and show the possible efficiency of the offered plant. The actually achievable production services depend on different factors like quality of inlet wire, drawing dies, spools and/or barrels, skills of the operators and other inline components etc.			

Notes	<p>Tension in the annealer</p> <p>The tension on the annealed wire must not exceed the heat resistance of the material. We recommend a standard value of approx. 20% of the cold yield strength.</p> <p>For final products conforming to high requirements, we recommend carrying out tests on our in-house testing line.</p>
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3. Technical description of the drawing machine 180-15

CSR; WE

a) Machine gradations (correspond to the theoretical wire elongation or cross-sectional reduction without slippage); indications: 1st cone pair / 2nd cone pair / final die

WE without s : 16 / 16 / 16 %
 CSR without s : 13.8 / 13.8 / 13.8 %

b) Drawing-die gradations (correspond to a possible wire elongation or cross-sectional reduction with slippage); indications: pre-drawing die / 1st cone pair /

2nd cone pair / final die

WE with s : max. 18 / 18 / 18 / 18 %
 CSR with s : max. 13,8 / 15,3 / 15,3 / 15,3 %

Note: The indicated drawing die gradations represent a possible value; the actually required or possible cross-sectional reduction has to be determined by the user considering the necessary slippage. Please note that too small slippage can result in wire breaks, too high slippage can result in high wear of drawing cones and drawing die.

Number of installed dies

20, of these:
 - 1 pre-drawing die with max. 18 % WE
 - 2 x 9 cone dies with 16 % WE without slippage
 - 1 final die with 16 % WE without slippage

Minimum assignment

12 dies

Drawing cones

steel with ceramic coating (chromium oxide ceramic **or tungsten carbide**)

Number of steps per cone
 max. step-Ø
 min. step-Ø

9
 200 mm
 61 mm

Number of cone pairs

2

Arrangement of cone pairs

vertically; with S-deviation between 1st and 2nd cone pair

Intermediate drawing ring

Ø 52.6 mm

Capstan / dry capstan

running surface-Ø 200 mm made of stainless steel

	with hard metal coating (e.g. VT 64 make VT Kämpfer or UR 65/B make Rizzardi); cylindrical running surface
Capstan cooling	closed pressure circulation system; shaft-type feeding system on drive side; forced cooling-water supply in the area of the capstan; all components getting in contact with water are made of stainless steel or brass
Cooling-water supply	with flow control instrument
Return stop	final drawing shaft with return stop (prevents tension release of the wire on the capstan in case of machine stop)
Spreader disc	running-surface Ø 170 mm made of aluminum with ceramic coating (aluminum oxide ceramics e.g. VT 8 make VT Kämpfer); cylindrical running surface
Wire deflection pulleys in front of drawing chamber	running-surface Ø 125 mm made of steel with ceramic coating ; adjustment of the pulley holder to the desired inlet position manually (without tool) via notch lever
Wire inlet pulley within drawing chamber	roll with running-surface Ø 50 mm made of steel with ceramic coating VT 6 make VT Kämpfer; ball bearings; inlet possible onto each step of the 1st cone pair
Wire deflection pulley in drawing chamber	running-surface Ø 50 mm made of steel with ceramic coating ; ball bearings;
S-deviation between 1st and 2nd cone pair	running-surface Ø 50 mm made of steel with ceramic coating ; ball bearings;
Dancer and other deflection pulleys	running-surface Ø 160 mm made of aluminum with ceramic coating
Speed measurement (signal transfer to annealer)	via digital signal from the frequency converter
Wire straightener	not included; will be provided by the customer, if necessary
Drawing machine drive	three-phase asynchronous motor (make at our choice) with 32.5 kW rating; threshold point 87 Hz (2585 rpm); with separate fan; with temperature monitoring device speed adjustment via frequency converter (make Lenze) and rated value presetting; speed indication and rated value presetting via the operator panel the frequency-converter drive corresponds to the requirements of the EC-EMC directive Drawing drive dancer-regulated; the master drive is located in the automatic spooler
Dancer	weight-operated dancer balance
Wire tensile force	between capstan of the drawing machine and master

	capstan in the automatic spooler 150 - 500 g (1.5 – 5 N)
Drawing shaft drive	via toothed belts
Shaft lubrication	grease lubrication
Seals on the drawing shafts	axial face seals made of NBR
Drawing-agent supply system	will be procured by the customer
Arrangement of drawing room	The drawing room is flooded during the drawing process.
Volume of drawing chamber	approx. 250 l
Discharge of drawing chamber	via manually operated ball valve
Drawing-agent level control	by means of capacitive sensor in the drawing chamber; the drawing machine is automatically switched off, if the minimum level of the drawing chamber is not reached
Drawing-agent tank	will be procured by the customer
Drawing-agent circulation pump	will be procured by the customer
Rinsing / spraying of dies	in addition to the immersion process the drawing dies and the final drawing die are sprayed via separate nozzles for reducing any deposits of the wire abrasion in front of the drawing dies
Drawing-agent spraying pump	will be procured by the customer
Compressed air (Option)	spray gun with spiral hose
Drawing-agent cooling	will be procured by the customer
Drawing-agent temperature monitoring device	not included
Drawing-agent cleaning	not included
Leakage collecting trough	not included; will be provided by the customer according to the actually valid legal regulations
Drawing-agent cleaning	not included; will be provided by the customer, if necessary
Pre-drawing die holder	suitable for drawing dies $\varnothing 25 \text{ mm} \times 8 \text{ mm}$; arrangement in front of 1st drawing step of cone 1 in the drawing chamber
Drawing die holder	suitable for dies $\varnothing 25 \text{ mm} \times 8 \text{ mm}$
Final die holder	of cardanic design; without water cooling for the final die; suitable for dies $\varnothing 25 \text{ mm} \times 8 \text{ mm}$
Wire steadying device	felt holder
Machine frame	welded structure made of mild steel ; drawing chamber and pipelines (except 3" return pipe)

	made of stainless steel; drawing chambers made of stainless steel
Vibration insulation	via damping elements
Machine lighting	lamp above capstan
Accessories	sharpening device and auxiliary die holder

4. Technical description of the inline annealer RI 120.2.N.070 (make Niehoff)

4.1 Technical specification

Plant design	Production direction from left to right
Wire quality	in accordance with EN 13602
Noise level	max. 80 dB(A), mean sound pressure level measured at a distance of 1 m to the machine in accordance with DIN 45635
Paint	Machines: RAL 230 60 20 (blue) and RAL 7035 (light grey) – "Niehoff New Design" Switch cabinets: RAL 7035 (light grey) rotating parts: RAL 1004 (golden yellow)
Space requirements	see enclosed layout drawing
Electrical equipment	<p>in accordance with VDE 0113 / EN 60204, without wire identification for ambient temperature min. + 5°C/max. + 40°C, the average temperature not exceeding +35°C over a period of 24 hours. Altitude up to 1000 m above sea-level. Relative air humidity: max. 50% at 40°C max. 90% at 20°C.</p> <p>The electrical equipment of the machine/plant is designed in such a way that it will perfectly operate under the requirements of the supply voltages specified in EN60204-1/4.3.2.</p> <p>Due to the switched-mode drives, the NIEHOFF machines are equipped with power chokes in order to minimize any reactions of the mains.</p> <p>The whole of the mains reactions on the energy supply mains in the plant can only be improved by a coordinated compensation system of the customer. It is recommended that the customer carries out a mains analysis after commissioning of the plant.</p>
Mains voltage	3 x 400 V +/- 10% / + PE
Mains frequency	50 Hz +/- 2%
Control voltage	230 V AC / 24 V DC
Wiring	Connection cables from the switch cabinets or from the control panel to the machines, as well as from the annealer transformer to the annealer, are included in the scope of delivery.
Cable feed to the switch cabinets	from below

Piping	Supply lines to the drawing plant are to be provided by the customer
Control and display devices	installed in the switch cabinet or control panel
Installation of the plant	Preparation of the foundations at site provided by the customer in accordance with NIEHOFF foundation drawing.
Compressed air supply	if provided by customer: 6 bar overpressure (6×10^5 Pa), water- and oil-free required
Cooling water supply	max. 30 °C inlet temperature (recommended values are 25 °C); differential pressure between the cooling water inlet and outlet is 2 bar (2×10^5 Pa)
Inert gas supply	nitrogen; 0.3 bar overpressure (0.3×10^5 Pa) ; reducing valve provided by the customer
Operational safety	The machines are constructed in accordance with the German law on technical working equipment and comply with the basic requirements of the EU machinery directive 2006/42/EC. We are not liable for any damage arising from failure to observe the safety regulations or by removing the protection devices during operation.
Electromagnetic compatibility	The plant complies with the EMC Directive 2004/108/EEC. The necessary measures for EMC-compliant installation of the switchgear, as well as input filters for the frequency converters are included.
Software	The PLC software for all delivered machines and plants provides the customer with a closed functional unit. The PLC programs are the intellectual property of the company Niehoff GmbH, the customer shall acquire a right to use the software. Changes in the software of the supplied machines are only carried out by the company Niehoff GmbH. Any changes of the programmer by the customer will render the warranty void. Programming tools and programming devices can be purchased directly from the respective suppliers (e.g. Siemens) and are not included in the scope of supply of the Niehoff machines.
Technical documentation	a) together with the delivery of the production plant: <ul style="list-style-type: none"> - operating instructions - maintenance instructions - assembly drawings - wiring diagrams - spare parts list b) before the delivery of the production plant: <ul style="list-style-type: none"> - installation and foundation plan - preliminary wiring diagram

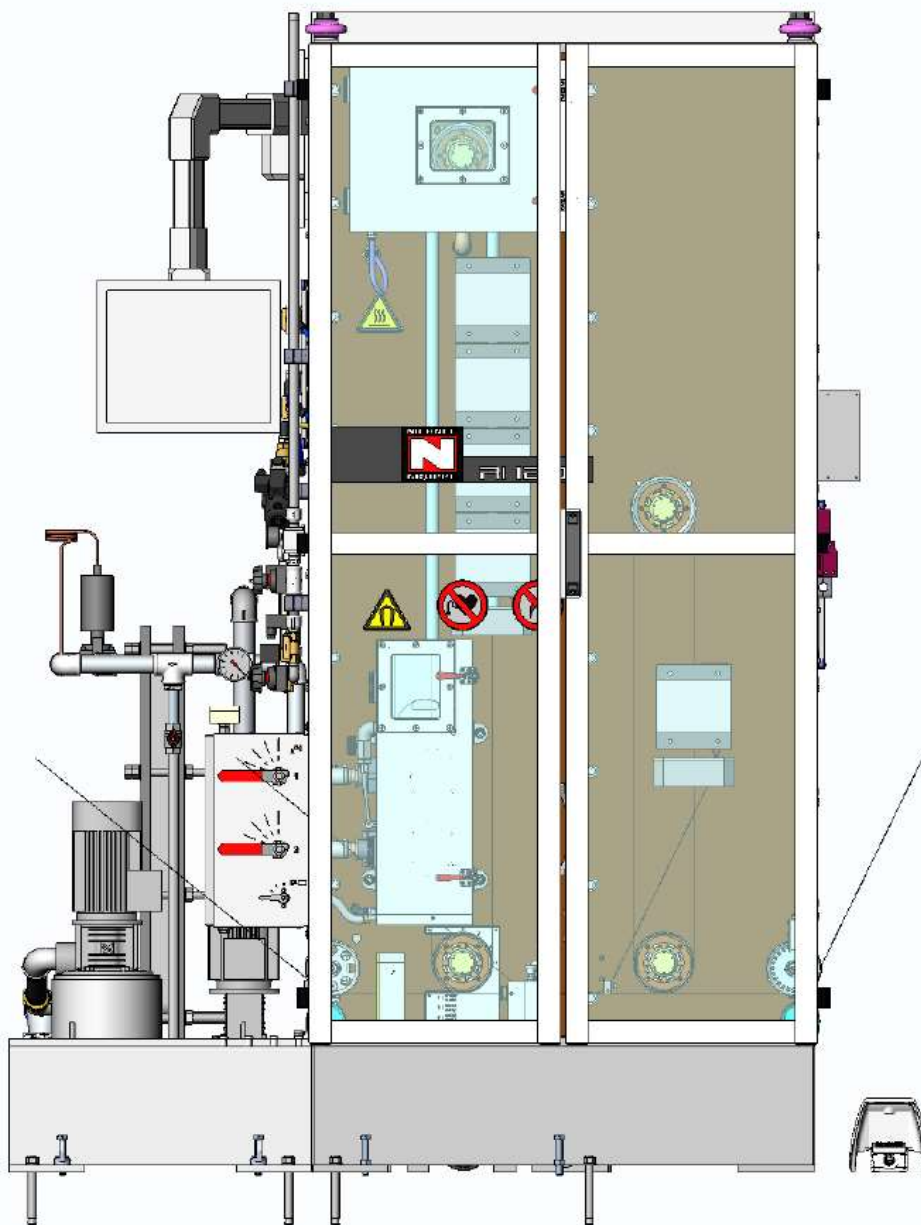
4.2 Technical data of the individual machines

Inline annealer with inductive energy input RI 120.2.N.070

Inline annealer	<p>Stainless steel housing, approximate size: 1300 mm wide, 2550 mm deep (integrated switch cabinet), 2350 mm high including:</p> <ul style="list-style-type: none"> - 1 piece short circuit roll, 120 mm diameter, bearing with insulated housing/axis - protection gas introduction for the annealing room - individually customized transformer packages for inductive heat supply, to activate either - working frequency 8 to 16 kHz - 1 piece deflection roll, 120 mm diameter, ceramic, bearing with insulated housing/axis - axle base 1600 mm - cooling section with centring for cooling nozzle, wire dryer, Stripper and ceramic guidance, quick change system - connections for cooling water supply and return piping - blow-off nozzle with centring for wire dryer, stripper and ceramic nipples, quick change system - glass tubes and chamber as wire housing for protection gas - safety switch for the housing door in the dangerous area (This door can only be opened if the voltage has been switched off and a push-button has been pressed in addition.) - with wire bypass for hard drawn wire
Electrical equipment for annealer	<p>Due to the medium frequent annealing voltage, the electrical switch cabinet must be installed near the annealer. Depending on the variant of energy supply, the switch cabinet with the regulator or, if technically necessary, the switch cabinet with the contactors will be mounted at the rear of the annealing housing for variable connection of the transformers.</p> <ul style="list-style-type: none"> - 1-phase current inverter 70 A - Siemens S7 PLC - linking components - drive of the protective gas and compressed air - drive of the magnetic valves for cooling water and compressed air - ampere and voltmeter for the annealing current
Interface	<p>Provided by the customer in case of integration in an existent line: In case of order the necessary Interface need to be defined with the customer and NIEHOFF</p>

Coolant circuit	<ul style="list-style-type: none"> - supply capacity approx. 30 l/min - flow pressure approx. 5 bar - cooling quantity 1,2 m³/h - coolant: water or light emulsion - temperature indication - flow indication - level monitoring with float switch
Standard equipment	<p>Hydraulics brand REXROTH Pneumatics brand BOSCH-REXROTH / FESTO / GEMÜ Electrical equipment DC/AC converter brand VECTRON / S&M / EMA Control brand SIEMENS S7 Visualisation brand SIEMENS</p>

4.3 Layout Inline Annealer RI 120.N.070 (for information only)





5. Technical description of the automatik spooler

Spool range

K 125/16 acc. to DIN 46399 (bore-Ø 16 mm);
K 160/22 acc. to DIN 46399 (bore-Ø 22 mm);
K 200/22 acc. to DIN 46399 (bore-Ø 22 mm);
P 5 (Ø 160 / Ø 90 x 114 mm with Ø 20 mm bore)
P 15 (Ø 250 / Ø 110 x 140 mm with Ø 20 mm bore)

Note: Only perfect and concentric spools must be used; max. permitted variation in concentricity from the bore axis to the core 0.1 mm; disposable spools must be used once only; the suitability of the spools for the above application has to be guaranteed by the customer.

Balancing grade

min. Q 16 as per VDI 2060 (applicable for metal spools only)

Spool fastening	via pneumatically clamped and mechanically locked tailstock spindle (pneumatic cylinder with mechanical clamping unit)
Spool adaptors	adaptor plate and adaptor mandrel on each tailstock spindle side
Clamping pressure	firmly adjusted clamping pressure
Monitoring of spool tension	via detection of pressure and position
Spooler drive	dancer-regulated and via frequency converter (make Lenze) operated three-phase asynchronous motor with 7.5 kW rating (make at our choice); threshold point, 50 Hz (2880 rpm); with separate fan; with spring-operated and electromagnetically eased brake; with temperature monitoring device; with resolver
Spool brake	s. spooler drive
Deceleration time	max. abt. 5 s in case of emergency-stop or wire break
Drive of spool shaft	via flat belts
Spool shaft lubrication	grease lubrication
Spool magazine	empty spool / full spool magazine suitable for 5 full and 5 empty spools plus 1 spool in the tailstock spindle so that a total of 6 spools can be automatically wound without having to discharge/equip the magazine.
Wire clamping and cutting device	pneumatically activated (pneumatic claw for wire cutting and clamping procedure during spool change)
Fastening of wire start to spool core	by means of clamping and wrapping (reduced wire end)
Device for cutting end of wire	pneumatically activated (cuts off projecting end of wire and disposes of this in a collection box)
Fastening of end of wire to wound material	loose end (<u>no</u> taping)
Traverse unit	<p>wire traverse unit which automatically adapts the traversing width to the actual spool geometry by means of optical detection of the spool geometry at winding material level via light barriers and a corrective system (variant C2).</p> <p>Basic setting of the traverse unit is effected by selecting the spool type via the operating menu.</p> <p>The traverse unit is equipped with its own drive, which generates the linear movement in reversing operation via a ball roller spindle.</p> <p><u>Note:</u> The light barriers of the spool detection require special care, i.e. they must be cleaned regularly and according to the requirements.</p>

Drive of wire traverse unit	servo motor and ball roller spindle controlled via servo frequency converter traversing step/speed continuously adjustable
Traversing step	max. approx. $4 - 5 \times d_{\max}$ <u>Note:</u> 1xd traversing step is not possible. <u>Note:</u> 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 $\pm 10\%$. Operation with constant traversing speed is possible (traversing step increases with increasing filling ratio)
Drive of light barrier holder	brushless DC planetary gear motor ; controlled via regulating electronics
Dancer	weight-operated dancer compensator; adjustment of the dancer weights by hand
Rewind tensile force	min. 1.5 N (150 g); max. 4.5 N (450 g) <u>Note:</u> The optimum rewind tensile force has to be empirically determined by the customer. Damages resulting from a wrong rewind tension (e.g. damages on the spools) are at the sole responsibility of the customer.
Deflection pulleys	running-surface \varnothing 160 mm made of aluminum with ceramic coating <u>Note:</u> Wire guide with 90° deflection according to known photos and layout
Traversing pulley	running-surface \varnothing 75 mm made of steel with ceramic coating
Master capstan	running-surface \varnothing 170 mm x width 31 mm; aluminum with ceramic coating ; cylindrical running surface
Drive	Compact servo motor make Lenze with 2.3 kW rating; motor with separate fan and temperature monitoring device; with resolver
Spreader disc	running-surface \varnothing 170 mm x width 31 mm; aluminum with ceramic coating ; cylindrical running surface
Machine lighting	working area illuminated
Machine frame	welded structure made of mild steel
Vibration insulation	via damping elements

6. Technical description of the wire pay-off device

Not applicable; will be procured by the customer

7. Process materials and media

Drawing agent	<p>conventional Cu-wire drawing emulsions, which will be procured by the customer;</p> <p>from the view of the machine manufacturer, the following requirements are to be defined to avoid injury to persons and damage to property:</p> <ul style="list-style-type: none">- max. viscosity 22 mm²/s (cSt)- max. admissible drawing-agent temperature 50 °C- sufficiently cleaned (= free from abrasions and wire residues which clog the drawing-agent circuit or damage the drawing-agent pump) <p><u>Note:</u> Drawing emulsions can considerably reduce the service lives of the shaft seals or the axial face seals (shorter maintenance intervals).</p>
Cooling water	<p>the cooling water supply will be effected by connection to the cooling-water circuit at site;</p> <p>from the view of the drawing-machine manufacturer the following requirements must be defined to avoid damage to persons, material and environment:</p> <ul style="list-style-type: none">- connection to cooling water system at site (secondary circuit); the cooling-water return must not be guided directly into waters or the seepage; the water-protection regulations are to be observed- the cooling water must be free of rust and other particles- to avoid damage by frost, the cooling water must be provided with corrosive preventive, if necessary- water hardness 4 ... 10 °dH- pH 6.7 ... 7.5- max. admissible cooling water run-on temperature 25°C- min. required differential pressure 0.5 bar- max. admissible differential pressure 1.2 bar- max. admissible static pressure 3 bar- cooling water demand max. approx. 150 l/h for the capstan cooling <p>to be installed by the customer at site:</p> <ul style="list-style-type: none">- lockable main cock- monitoring pressure gauge with operating pressure indication
Compressed-air	<p>compressed-air supply will be provided by the customer at site;</p> <p>requirements of compressed-air system:</p> <ul style="list-style-type: none">- min. mains pressure 6 bar- max. mains pressure 10 bar- compressed air must be dry, free of dust and oil; <p>(select quality class of compressed air as per DIN ISO 8573-1 considering the pneumatic components acc. to</p>

the parts list corresponding to the operating conditions)

to be installed by the customer at site:

- lockable main cock
- monitoring pressure gauge with operating pressure indication
- any accessories required (e.g. compressed air storage in case of pressure fluctuations)

Pneumatic components

make Festo

Hydraulics

not available

8. 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.

Protection mode of el. control

IP 44

Mains voltage

3 x 400 V (+ 6 % /-10 %); PE

Mains frequency

50 Hz +/- 2%

Control voltage

24 V DC

Switch cabinet

stand-alone cabinet

Installation

at a distance of max. 10 m from the drawing machine

Switch cabinet dimensions
(drawing machine and spooler)

H = 1800 mm + 200 mm base; L = 2000 mm;
D = 500 mm

Switch cabinet (annealer)

xxx -> to clarify

Cabinet cooling

air-conditioning unit

Cable connection of switch cabinet
to the machine

largely on plug, except for all
motor cables

Electric components

make at our choice

Frequency converter

make Lenze or Siemens

PLC and TP

make Siemens

Control

via PLC make Siemens type S7

Bus system

Profinet

Internet teleservice (Option)

via Netbiter EC 350

Operating and control elements

Switch cabinet

- main switch

Drawing machine	<ul style="list-style-type: none"> - pedal key inching (three-position pedal key with emergency-stop function) - emergency-stop device (key)
Automatic spooler	<ul style="list-style-type: none"> - control voltage On - emergency-stop device (key) - key switch hand / automatic - wire end detector - pedal key inching (three-position pedal key with emergency-stop function) <p>The remaining operating and control elements of the drawing machine and the automatic spooler are integrated into an operating panel (TP 700 comfort made by Siemens); the control panel is located at the automatic spooler.</p>
Pilot lamps	three-colour
<ul style="list-style-type: none"> green green flashing orange orange flashing red 	<ul style="list-style-type: none"> normal operation spool change feeding operation stop owing to missing spools or full spool magazine trouble
Wire diameter measuring unit	not available
9. Miscellaneous	
Paint	<ul style="list-style-type: none"> machine RAL 7035 (light grey) structural varnish; switch cabinet and terminal boxes RAL 7035 (light grey) structural varnish; deflection pulleys not painted;
Documentation	3-fold in Spanish language; manuals of components (e.g. frequency converter) 1-fold (mostly in English