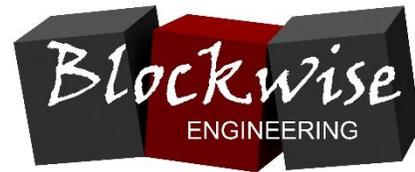


Stent Crimping Machine Model CX with 2-Crimp



Blockwise Engineering, LLC
<http://www.blockwise.com>

The Blockwise **Stent Crimping Machine Model CX with 2-Crimp™ Compression Station** is a full-featured radial compression machine suitable for use in the stent-attachment step in the assembly of balloon-expandable stent delivery catheters. The machine is also suitable for and widely used in many other radial compression applications in medical device manufacturing. The heart of the machine is a 2-Crimp™ (patented) radial compression station with hardened stainless steel dies that form a cylindrical opening ranging in diameter from 0 to 16 mm. The powerful, low-friction, high-precision 2-Crimp™ mechanism, and the unique control system result in superior crimping process control, easily beating the competition in: precise control of diameter at any crimping force, precise control of crimping force, uniformity of temperature, and durability. The touch-screen interface is very intuitive and convenient, with “recipes” specifying arbitrary sequences of process steps.

CX Stent Crimping Machine
shown with:

- Vacuum / Pressure Supply
- Heated Dies
- 180 mm Length 2-Crimp Compression Station



A **stepper motor** provides power to open and close the compression station. An integrated encoder measures the diameter of the opening. A **force transducer** measures the actuating force, which is proportional to the radial compression force.

A complete crimping machine includes a Model CX machine base and a 2-Crimp™ radial compression station. The Model CX machine base is **also compatible with a variety of other Blockwise radial compression stations**, which are chosen based on 1) diameter range, 2) length range, 3) radial force range, and 4) die material.

The Blockwise machine controller implements a closed-loop control of diameter or compression force, with a unique system that compensates for the mechanism’s compliance in a way that is transparent to the user; the

machine **achieves and displays the commanded diameter regardless of the force** required to reach that diameter.

A **touchscreen HMI** (Human/Machine Interface) allows the user enter parameters in “recipes” that specify a sequence of diameter or compression force “steps”. Depending on the options installed, the recipe may also control pressurization or evacuation of the balloon, temperature of the compression dies, and leak testing of the balloon. Calibrations and gauge checks are easy and intuitive, guided by displays on the touch-screen interface. A manual mode allows the user to directly command the machine without using a recipe sequence. Engineering, maintenance, and manual functions may be password-protected.

After loading the product, an operation sequence is initiated by pressing the START button or the foot switch. The machine sequences through a series of “steps” defined in the currently-selected recipe. The progression of the steps can be automatic with programmable delays, or set to wait for a press of the START button or footswitch. After cycling through all of the steps in the sequence, the controller returns to the open position. **The user defines each step to be either a force setting, diameter setting, or, if the machine is so equipped, pressure on or off, or vacuum on or off, force verification check, diameter verification check, or leak test.** There may be up to 50 steps in each recipe, and up to 100 recipes. Force and diameter steps also have associated approach speeds. Pressure “on” steps have an associated pressure set-point.

A **product carrier** on a manually-powered linear slide holds the catheter and includes alignment features to allow the operator to control the axial extent of crimping on the product.

Available options include:

Vacuum / Pressure Supply The catheter or product is connected to the high-pressure Simpluer connector and may be evacuated before, during, or after compression according to the recipe settings. The product may be pressurized **up to 20.7 bar (300 psi)** at any point during the sequence.

Heated Dies Cartridge heaters, temperature sensor, and over-temperature switch are installed in the dies. Recipes containing a heat on / off setting and a temperature setpoint that may range from 0 to 100C.

Integrated **leak tester** allows user-defined pressure or vacuum leak checks to be performed at any point during the crimping process, without disconnecting the catheter, and with minimal added trapped-air volume.

Although not covered by this data sheet, an **optional "autosheathing"** capability is available for the Model CX machine base. Commonly used to crimp drug-eluting stents or balloons, it uses thin PTFE film to protect the stent/balloon from the crimper dies.

Specifications:

Compression Station Opening Diameter Range	0 to 16.0 mm
Die Lengths Available:	180 mm
Die Material	Hardened Stainless Steel
Die-to-Die Gap	Approx. .03 mm to .09 mm (0.001” to 0.0035”)
Compression Station Actuation Power	Electric (stepper motor)
Die Heating Temperature Range	Room temperature to 100 C
Balloon Inflation Pressure Range	0 to 20.7 bar (300 psi)
Maximum Total Radial Force Available	8000 N (1800 lbf)
Number of Compression Dies	9
Machine Dimensions	76 cm width x 61 cm depth, 61cm height (30”x24”x24”)
Sequence Control	Up to 50 crimp and/or pressure/vacuum control steps, programmed with touch-screen operator interface panel
Service Connections	AC power 110 to 240 V, compressed air 5 to 7 bar, high pressure air or nitrogen for balloon inflation, 21.5 to 27 bar

DIAMETER

15.00 mm

FORCE

0.0 N

BALLOON PRESSURE

SET
OFF **1.0** psi

TEMP

SET
70.0 **69.5** C

SETUP

RECIPE: 4

NAME: PTCA 3.5 X 30

STEP	TYPE	SETTING 1	SETTING 2	TIME
0	DIAMETER	15.00 mm	3.00 mm/s	
1	DIAMETER	1.30 mm	3.00 mm/s	1.0
2	PRESSURE	ON	250.0 psi	30.0
3	FORCE	150.0 N	1.00 mm/s	2.0
4	PRESSURE	OFF		2.0

MODIFY RECIPE