

QUALITYMASTER

CORRUGATOR PROCESS CONTROL

The CoparSolutions CTC QualityMaster™ helps optimize product quality by continually monitoring and adjusting critical corrugator variables. More consistent product is produced through automatic adjustments when the machine speed varies, the paper grade changes, and when rolls with different moisture contents are loaded into the process.

Center-lined Operations

Corrugator performance becomes more repeatable by removing variance from operator to operator and from shift to shift. The most effective way to ensure center-lined goals are achieved is through automation.

Center-lined process temperatures, starch values, and web tensions are saved for each paper grade combination. These target values are recalled and automatically applied each time the grade is run.

Consistency

With QualityMaster part of the process, you will immediately see more consistent, flat sheets across the plant floor. Consistency throughout an order is important for the customer.

Automation helps produce quality sheets throughout the order at full production speed, during machine slow downs for splices or setup changes, and by compensating for roll moisture and temperature variance after a splice.

Process Control

The QualityMaster will help your operators produce stronger board with a better printing surface by standardizing and automating process variables. As production speed changes and new rolls are spliced into, the system applies grade specific adjustments in several ways:

- **Paper Temperatures:** Preheater and preconditioner wrap arms adjust to maintain center-lined targets.
- **Heating Section:** Individual sections raise or lower to maintain the target temperature.
The heating section entrance wrap arm position can be added to the grade recipe (optional).
- **Starch gaps with speed curves:** Meter gaps adjust to the target for each grade. Highly customizable curves help reduce starch consumption when the machine speed increases.
- **Web Tension** (optional): Manage directional warp by controlling a web tension system.
- **Heating section steam throttling** (optional): Steam chest temperatures can be changed for certain grades, such as preprint or lightweights.
- **Closed-loop Warp Detection/Correction** (optional): Warp is measured by lasers mounted above the stacker. Automatic warp offsets override heating section and/or preheater temperature goals.
- **TSC (POP) Software:** When specific criteria are true, the doublebacker speed will automatically increase until any wrap arm or heating section reaches a heat 100% limit. The TSC helps increase production throughput.

Increased Production

Copar's Temperature Speed Control (TSC) software optimizes the corrugator speed, accounting for heat that is not being fully utilized. If certain conditions are met, the machine will increase speed gradually until it hits a speed limiting condition, such as maximum knife cut speed. The plant will benefit with a more efficient use of available heat energy while production output will increase.



COPAR SOLUTIONS™

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Durability

Infrared Temperature Measurements with Improved Durability

The QualityMaster measures paper temperatures at multiple points on the corrugator. The infrared sensors provide closed-loop feedback control for wrap arms and the heating section. Temperature measurements are displayed on screen in real-time, and are also recorded to system logs, which may be reviewed later to investigate problems in the converting department or customer complaints.



Improved Accuracy Over the Entire Temperature Range

- The infrared sensors used by Copar have been upgraded for more accurate temperature measurements.
- The electronics are separated from the sensor head, which makes the sensor less prone to machine vibrations. Previous sensors had fixed calibrations that could drift with machine vibration over time.

High Thermal Stability

- New digital technology found in these sensors can tolerate ambient temperatures as high as 248° F (120° C).

Greater Mounting Flexibility

- A reduced 15:1 spot size ratio allows the sensor to be mounted further from the paper for locations with limited space. The smaller spot size makes it easier to avoid “seeing” machine frames or other obstacles.

Field Calibration is Possible

- An optional USB cable may be provided to allow parameter modification in the field.

Brackets, Mounting Hardware, DC Wires and Cables are Provided

Included vs. Not Included

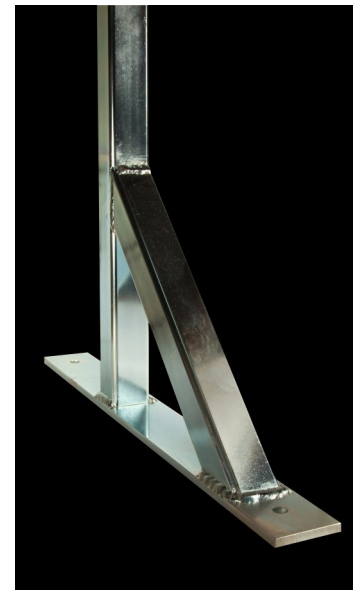
Copar provides all parts, sensors, brackets, and cables needed to install our systems. Some suppliers rely on the installer to make improvised field decisions depending on what's available to them, resulting in inconsistencies between each facility. The QualityMaster includes all parts and materials for standardize, consistent installations.

Zinc Plating

Our steel brackets are zinc plated to provide a professional appearance, excellent corrosion resistance, and to ensure many years of service.

Teflon/PVC Insulated Wires and Cables

All cables included with our systems have Teflon/PVC combination insulated jackets. This material provides extra protection for the conductors and are easier to pull through the wireway during installation.



PLC Processing

Designed for the Environment

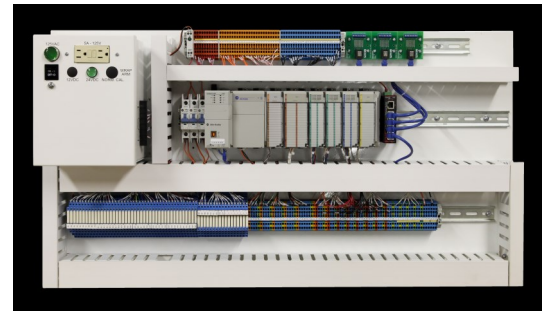
- Allen Bradley Compact Logix PLC processors and I/O modules are designed and tested for durability and longevity in industrial environments.

Easy Software Updates

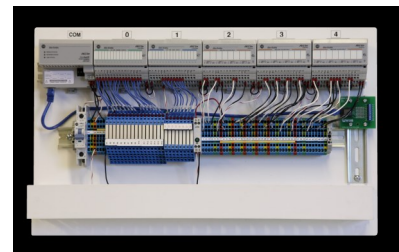
- Included with the system are free software updates for previously purchased options.
- Copar does not charge fees for performance updates for existing equipment.
- Updates can often be installed remotely via a VPN Network connection to avoid on-site service labor charges.

“Off the Shelf” Parts

- The QualityMaster uses Allen Bradley PLCs, which are readily available worldwide.
- Copar maintains a full inventory of PLCs and other off the shelf components.
- The plant’s spare part inventory can be kept to a minimum since these items are available for same day shipping and/or same day receiving if requested.



Doublebacker PLC



Singlefacer Flex I/O PLC

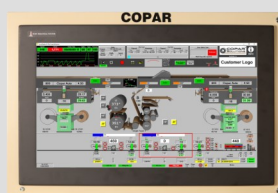
Operator Stations

Master Station



- Free-standing cabinet
- Internal tower computer

Remote Station



Each remote operates independently, and duplicates all operator functions of the Master Station (not a repeater screen)

- Remote Stations are compact for flexible mounting options
- Can be mounted to a walls, machine frame or post, or with optional stands.
- A pivot mount bracket is included which allows the screen to be tilted up or down for a better viewing angle.
- Internal mini computer

All Stations:

- 23” 1080p resistive touchscreens designed for industrial applications
- NEMA Type 4X sealed enclosures
- A Battery Backup and internal GFCI outlet are included for protection

WARP WACKER

**Minimize Warp
with
Laser Precision**

Warp Wacker (Optional)

Warp Wacker integrates with the Copar QualityMaster system for closed loop warp control. Warp Wacker continually monitors corrugated sheets on the stacker conveyor and adjusts the machine until flat board is produced.

With only two lasers, 1200 individual measurements can be made across a 110 inch (2,9 m) machine.

Inconsistent Roll Moisture

The Warp Wacker helps combat roll moisture/temperature differences when splicing one roll into another or if the roll moisture/temperature changes as the paper is unrolled.

The closed loop process adds a temporary goal offset if it detects warp

Exceeds TAPPI Standards

The Warp Wacker system is capable of detecting warp less than the TAPPI warp standard, all the way down to 3/4 of an inch (19 mm) over a 98 inch (2,5 m) web width. Each installation is catered to specific plant standards.

Variable Bridge Loading

Warp Wacker can be configured to communicate with the Copar Sync Master system. The system can automatically adjust bridge quantity levels to combat reverse warp issues.



Customizable Corrections

Each site is configured to meet customer specifications. A site can choose which machines are included in the process, as well as the order in which the corrections are made. A typical Warp Wacker adjustment begins with the heating section because it is closest to the lasers.

Once the heating section reaches a limit (no more adjustments are possible), the system makes additional adjustments at the next machine section (if necessary). Typical correction order:

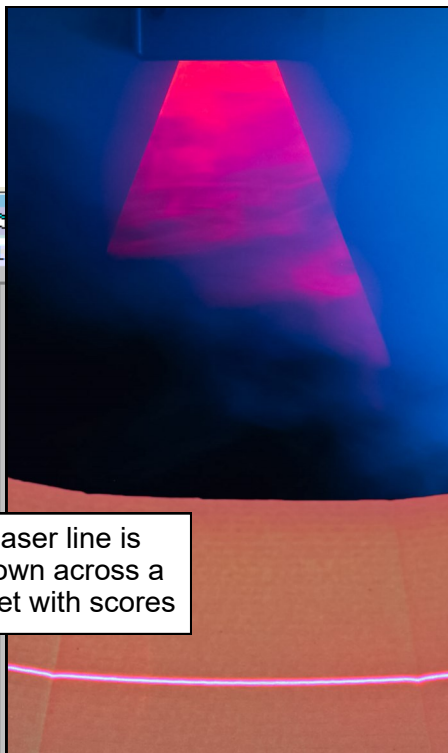
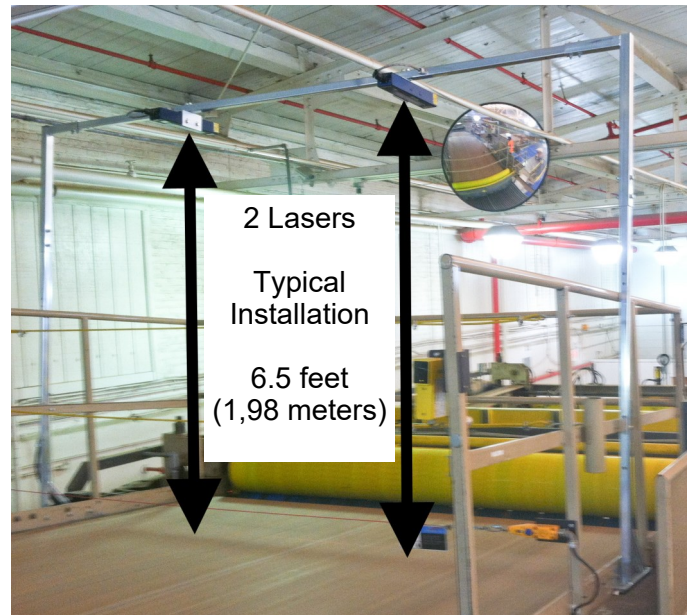
1. Heating Section
2. Doublebacker wrap arms
3. Singlefacer wrap arms (optional)
4. Variable Bridge Loading with Sync Master (optional)
5. Segmented Water Spray (optional)

Warp Wacker (Optional)

Sensor Locations Do Not Interfere with Stacker Operations

The Warp Wacker lasers are installed just before the stacker elevator.

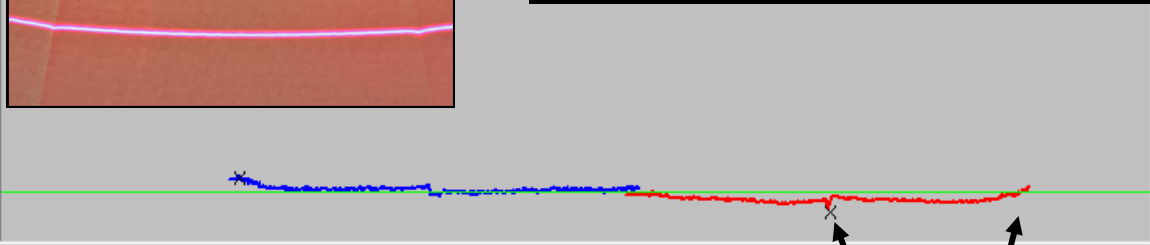
- Top knife level lasers are mounted overhead, well out of the way of the operators or board jam-ups.
- Additional lasers can also be mounted on lower knife levels.



Laser line is shown across a sheet with scores

Benefits and Features

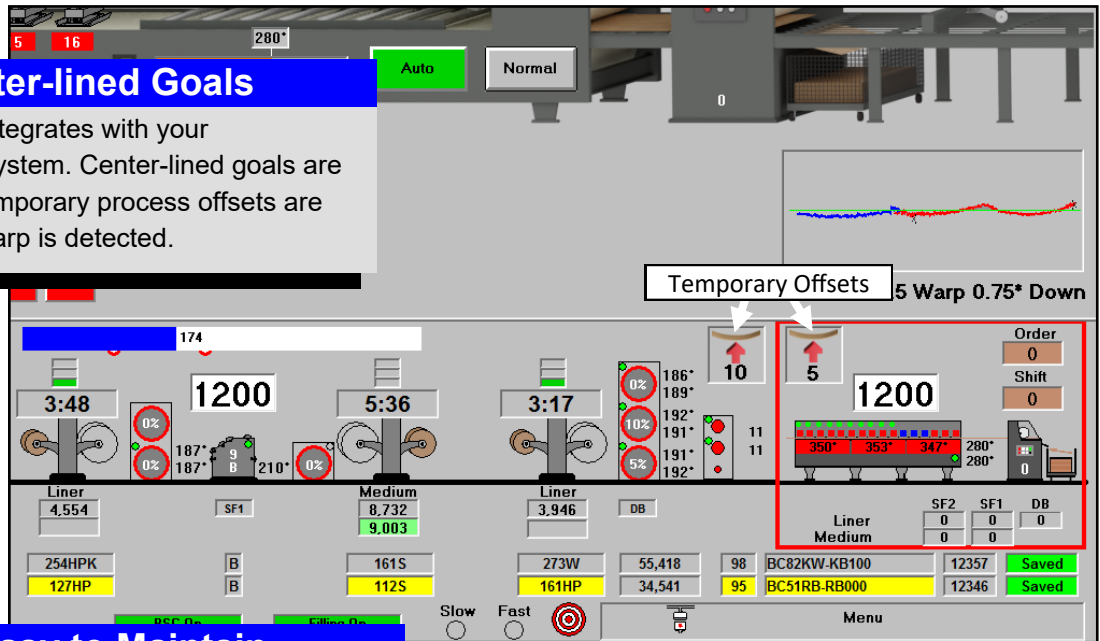
- Provides full time, closed loop corrections
- Reduces waste due to warped board
- Reduces operator time needed to correct warp
- Increases production speed since flat board is easier to stack
- Increases finishing department output with fewer jam-ups on high speed equipment
- Real time laser measurements are displayed for troubleshooting
- 100% Solid State, **No Moving Parts** or Motors
- No onsite calibration needed, ever...



Width	Warp	Up Warp 99/1
90.3	0.856	Up Warp 681/421

Center-lined Goals

Warp Wacker integrates with your QualityMaster system. Center-lined goals are maintained. Temporary process offsets are applied when warp is detected.



Easy to Maintain

The system has been designed for simplicity and is maintenance free.

- No moving parts or motors.
- No field calibration needed, ever.



Only two lasers are needed to monitor the entire machine width on the top knife level.

Plant Customizable

Mechanical:

Warp Wacker can be installed on all knife levels.

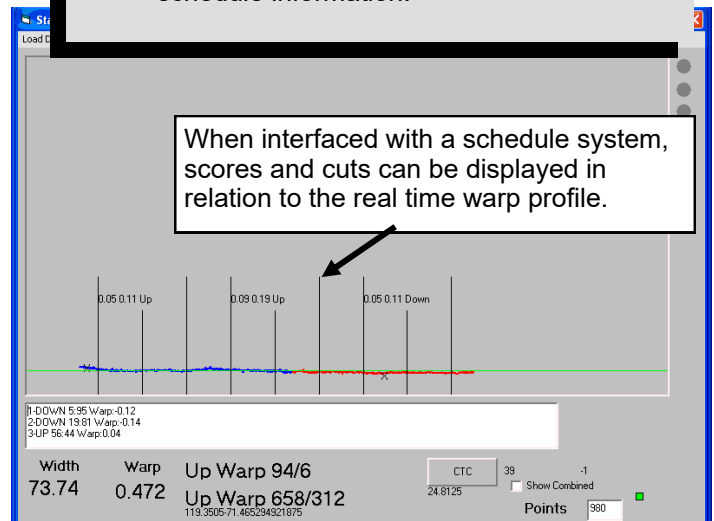
Process:

The plant may choose a custom warp correction strategy. Changing a procedure typically takes less than 3 minutes, and can be done remotely from Copar's home office.

Software:

Customizations can be made to display schedule information.

When interfaced with a schedule system, scores and cuts can be displayed in relation to the real time warp profile.



QualityMaster Options

Web Tension Interface

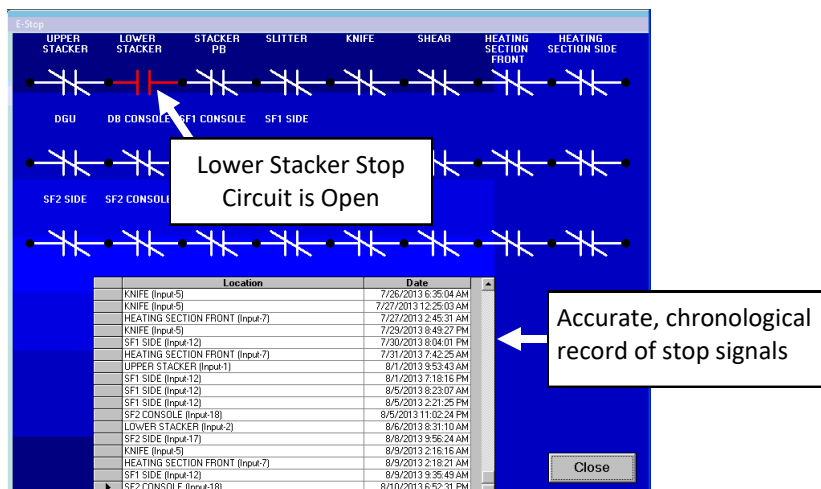
This option controls the web tension with an interface to your existing E&L or BHS Bridge Brake system via a remote set point.

- Target web tensions are saved for each paper combination, or a default value will be used.
- During a grade or width change, the web tension automatically changes when the splice reaches the tensioner.
- Tension settings are changeable from any Copar operator touch screen to compensate for unusual brake conditions.

E-Stop Monitor

Weekly start-up troubles often involve open stop safety circuits. The E-Stop Monitor is a graphical display and history log that indicates when a stop circuit contact has been opened.

- Can be connected to any pushbutton, whisker switch, run relay, or safety cord with isolated (dry) contacts.
- Can be connected to other operation indicators or processes for data logging purposes.
- The history screens allow maintenance to identify what contact opened first.
- The stop analysis screen is viewable from any Copar touch screen.



Steam Valve Throttling

Heating section steam chest temperatures can be changed by adjusting the steam pressure/temperature using PID controllers.

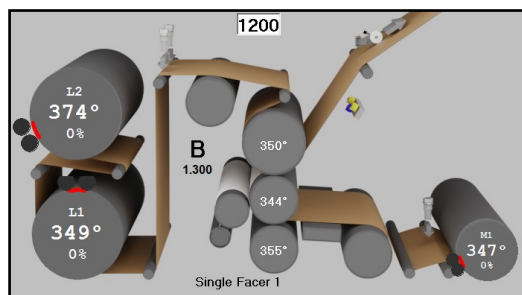
Steam throttling is used to prevent overheating of lighter basis weights and pre-print while keeping necessary ballast roller or shoe pressure on the board.

- Can be setup for temperature or pressure control setpoints depending on machine configuration.
- When a paper grade changes, steam values adjust automatically to saved process setpoints.
- Automated throttling ensures correct temperatures are being used for specific board grades.
- Steam adjustments can be made from any operator touch screen.
- Each section is controlled individually, allowing the temperature to increase or decrease incrementally as the material moves downstream.
- Options are available to tailor temperature to board speed.

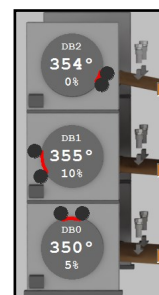
Steam Supply Monitor

The Copar QualityMaster system can monitor steam at crucial points on a corrugator.

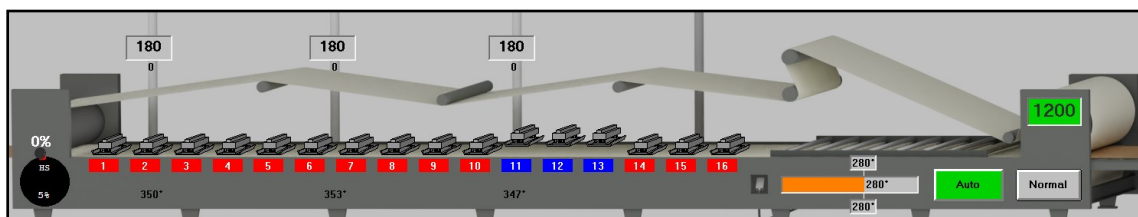
- The Steam Supply Monitor watches for low heat conditions, often due to trap failures, siphon problems, or an accidentally closed steam valve.
- A low steam temperature will alert operators both at operator touchscreens and at the machine with easy to see indicator lights.
- Low steam temperatures are logged to pinpoint which orders were affected.
- Steam locations displayed are customizable, based on machine characteristics and plant specifications. Copar can monitor up to 16 points at the doublebacker and 16 additional points for each singlefacer.



Singlefacer Steam Temperatures



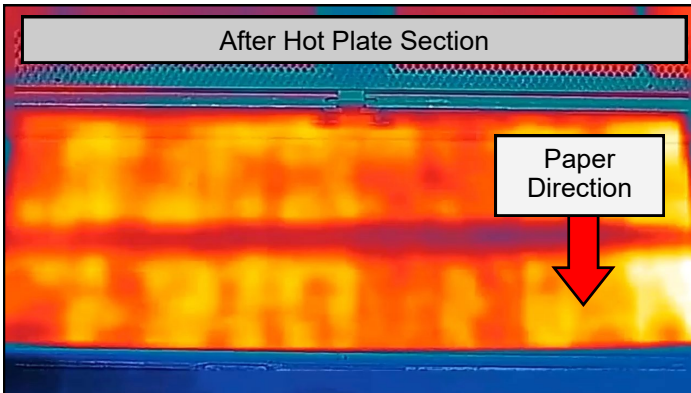
Triplestack Steam Temperatures



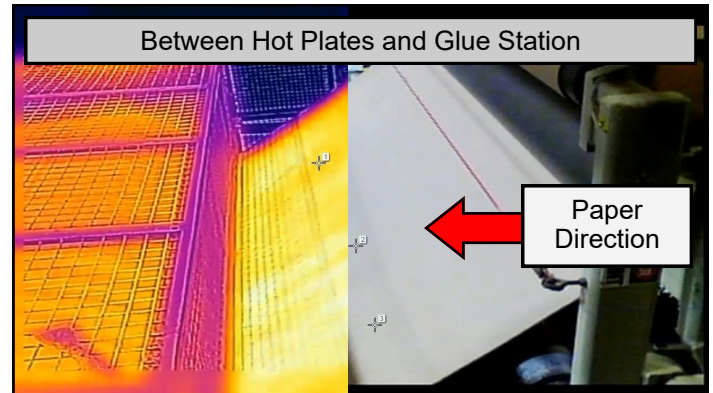
Heating Section Steam Temperatures

Thermal Imaging (optional)

The Thermal Image camera system helps operators identify hidden temperature/moisture problems quickly. Dedicated HDTVs showing the paper characteristics facilitates viewing multiple critical process locations simultaneously, leading to better product awareness and consistency.



Cold Festoon Folds (bridge was over-loaded)



Infrared Spectrum

Visible Light Spectrum



Dedicated displays makes operators more aware of changing paper temperature conditions.

Real-Time Temperature Displays

Visually Detect:

- Roll Parallel Issues
- Uneven Pressure from Heating Section Shoes
- Preheater water rimming
- Preheater siphon / trap malfunctions
- Sheets damage due to dirty a doublebacker belt
- Cold festoon folds due to an over-loaded bridge

Flexible Mounting Locations

Visually Inspect:

- Liner, Medium, or Combined Papers
- After Preheaters / Preconditioners
- After DB Multi-stack (double/triple/quad)
- After Glue Station
- After Heating / Traction Section
- After Shear



Screens may be configured to show multiple locations at once.

Seamless Transition with Results

Ease of Use

The QualityMaster is easy and intuitive to use. Computer screens are laid out in a simplified manner with easy to read values and indicators.

Indicators from the overview screen turn green if that part of the machine is in automatic mode, allowing a quick audit of all parts of the system. Additionally, all temperature and starch settings are displayed for quick checking of process readings.

Operator training is simplified with integrated help screens and diagnostics at the touch screen.



Automatic Email Reports

Optional daily, weekly, and monthly reports are automatically emailed to key personnel. These reports save managers time since they are delivered automatically. These reports can be used to verify the system is being used to its full potential.

Practical for the Operator

Operators are pleased to use the system as it actually reduces their workload.

Manually controlled machines require dry end operators to inform wet end operators when heat and starch adjustments are needed. With a Copar automatic system, the dry end can make adjustments directly, so the wet end can focus on hanging rolls and other important tasks.

Center-lined recipes help operators by adjusting heat and starch settings automatically at grade or width changes.



Return on Investment

Reductions in waste and increased throughput make the investment in a QualityMaster system easily worthwhile.

The investment costs of a QualityMaster system are typically repaid in less than one year.

2 Year Limited Warranty

Buy With Confidence. Copar is proud of the products we produce, and we stand behind them.

- A standard 2 Year Limited Warranty on parts is included with the QualityMaster system.