

JUICE PREPARATION AND ANALYSIS SYSTEM mod. TR01
OPERATIVE SPECIFICATIONS

Application:	Grinding a tomato sample with relative measurement of the “pH”, “Concentration” values and the “Lycopene/Colour” of the juice obtained in automatic cycles; used in laboratories for “Quality Analysis” on delivery to the tomato processing industry.
Type of measurement:	Refractometric measurement of Refractive Index and display of the relative concentration in the “BRIX” scale, already compensated in temperature. Measurement by means of “Electrode” with polymer electrolyte and display of relative pH value already compensated in temperature, by means of Receiver provided. Automatic spectrophotometric measurement of the colorimetric coordinates L, a, b and lycopene concentration levels in mg/100 g, with relative display of values.
Concentration measurement	Measurement limits: 1.3330...1.3478 nD (0...10 Brix) Accuracy: max. accuracy ± 0.0002 nD (± 0.15 Brix) Measurement scale: “BRIX” referred to conversion tables nD/Bx ICUMSA (1974)
pH measurement	Measurement limits: 2...14 pH Accuracy: ± 0.05 pH Reading resolution: 0.01/0.1 pH
Colour/lycopene measurement	Colour repeatability: $\Delta X, \Delta \Delta Y, \Delta \Delta Z < 0.07$ Lycopene measurement limits: 0...80 mg/100 g Lycopene accuracy: higher than $\pm 5\%$ of the given reading Maximum accuracy: 0.5 mg/100 g Lycopene repeatability: higher than ± 0.25 mg/100 g Product temperature: 5...65 °C with automatic compensation of temperature measured by means of Thermometer Pt100 made of INOX AISI 316, Class “B” in accordance with IEC751 (for Brix measurement) Quantity of grindable tomato: ~4 kg/cycle Cycle duration: Grinding 60 s - total 125 s

GENERAL SPECIFICATIONS

Power supplies	Electric: AC 3/N/PE 400V $\pm 10\%$ 50...60Hz 1.5kVA Connection by means of cable with connectors with “4P+T” plug CEI EN60309-2 Pneumatic: Dehydrated air 6...10 bar (87...145 psi) Connection by means of “Quick-release coupling” for plastic tube with diameter 6x4 mm Water: Water 1.5...4 bar (22...58 psi), expected consumption ~5 l/grinding cycle Connection by means of “Hose-connector” x fabric-faced tube with internal diameter 12 mm
Interfaces	Digital: RS422/485 for connection to PC or Data Acquisition and Processing Systems Inputs: N°1 input for acquisition of “Cycle External Start” command for connection to PC in automatic System control N°1 input for acquisition of “Wash Cycle Progress” command Outputs: N°1 relay output for indicating “Data Ready” with contact having capacity 24V/1A-DC/AC
Notes:	All the interfaces are optically isolated from the power supply (VDE0160); all connections must be made by means of terminal board.

CONSTRUCTIONAL FEATURES

Notes:	The Juice Preparation and Analysis System has a modular structure and basically consists of the following parts: Base unit with PLC, Juice Preparation System, Process Refractometer UR20/24, Receiver Transmitter RM01, all installed, assembled and interconnected in a single compact structure.
Execution:	INOX AISI 304 structure specially designed with access to the various machine sections by means of 3 doors fitted with locks.
Base Unit:	Function: System administration, operator interface, interface with the ancillary elements and with the process plant.
Features:	<p>“PLC” with microprocessor “CPU”.</p> <p>Polycarbonate “Primary” box (IP55) to house the “Electronic Control Section”.</p> <p>Polycarbonate “Secondary” box (IP55) to house the “Electric Power Section”.</p> <p>“Operating Controls” and “Indicator lights” relative to the main cycle phases by means of modular components on a Ø22 panel.</p> <p>“Automatic” Operating Cycle.</p> <p>Manual “Diagnostics” commands for activation of “Motor” and “Washing System”.</p> <p>Electric protection against accidental opening of access doors to the machine by means of “Safety Limit switches”.</p> <p>External pushbutton panel for remote control of “Washing Cycle Progress” complete with “Data Ready” warning sound and light (appliance not integrated in SV01 system).</p>
Juice preparation system	Function: Grinding tomato sample to reduce it to juice
Execution:	INOX AISI 304 cylindrical sampling tank with 3” “Tri-Clamp®” union for fixing Process Refractometer UR20/24.
Features:	<p>Grinding tomato by means of “Overlapping circular blades” that can be removed without using tools</p> <p>Blade rotation by means of 1.5HP-2850 rpm “Self-braking Motor”.</p> <p>PVC tank cover with “Safety limit switch” for stopping motor immediately if opened during the cycle</p> <p>Automatic washing with water at the end of each analysis cycle, pressure regulation by means of special Reducer.</p> <p>“Spray-Ball” Tank washing system.</p> <p>Drainage of process residue and washing; drainage system operated by means of electro-pneumatically controlled cylinder.</p> <p>Support for pH measurement electrode fixed by means of threaded ring nut.</p>
Process Refractometer UR20/24	Function: Refractometric measurement of Refractive Index of “Tomato Juice” and display of the relative concentration in “BRIX” scale, already compensated in temperature.
Execution:	Monobloc enclosure with cover in: aluminium anti-corrosion treated (UR20), 316 AISI stainless steel (UR24). Connected to sampling tank by means of 3” “Tri-Clamp®”.
Measurement section:	<p>“Synthetic Sapphire”, or “Optical glass” or “Balf” measuring prism.</p> <p>“LED” light source.</p> <p>“CCD” detection element.</p>
Electronic section:	<p>Microprocessor “CPU”.</p> <p>Measurement indication and software menu and alarm condition display by means of 128x64 characters backlit graphic LC display.</p> <p>Scratchproof polyester keypad with dome-shaped keys.</p>
Notes:	The optical section of the apparatus is dehumidified by means of Dehydrating Cartridge with Molecular Sieve.
Receiver Transmitter RM01	<p>Function: Measurement of pH value by means of “Electrode” with polymer electrolyte and display of reading in relative scale already compensated in temperature.</p> <p>Execution: Single-block “Polycarbonate” RAL 7035 painted, UV-resistant, non inflammable container; PVDF measuring electrode complete with Pt100 directly positioned on the Juice Preparation System Tank.</p> <p>Electronic Section: Microprocessor “CPU”.</p> <p>Indication of measurement and software menu display by means of 2x3 ½ digit + symbols, backlit</p>

	<p>alphanumeric LC Display. Scratch-proof polycarbonate control keypad with membrane keys.</p> <p>Software: Simultaneous reading of “Main Parameter” and “Temperature” with display of calculated value of measurement in process and indication of alarm condition, if any. Manual calibration of pH, mV, Temperature, Out mA scales with automatic buffers recognition. Proportional analog output on reading configurable in “Scale Start” and “Scale End” values, converted in digital RS485. Measuring Unit for temperature scale selectable between °C and °F.</p>
UK04 Spectrophotometric unit	<p>Function: Spectrophotometric measurement of the diffused reflectance of “Tomato Juice”.</p> <p>Execution: Enbloc body with aluminium lid, installation to the sampling bowl via 3" “Tri-Clamp®” attachment Comes supplied with white calibration Target.</p> <p>Measuring section: Product interface window in “Fused silica”. 10 monochromatic LED light sources (wavelengths 420– 470– 520– 568– 589– 620– 670– 880 nm) + interferential filter” light sources with sequential light up. Photodiode detection element.</p> <p>Electronic section: “Central Unit” with “CPU” microprocessor.</p>
Notes:	The optics section of the unit is dehumidified by Resistances and the working temperature is set by a thermostat at ±0.25 °C.
Materials in contact with the product:	<p>Pt100, Blade, Prism holder made of INOX AISI 304/316. INOX AISI 304 Sampling tank and accessories. PVC tank cover. Viton O-rings and gaskets. “Synthetic Sapphire”, or “Optical Glass” or “Balf” UR20/24 measuring prism. PVDF pH measurement electrode.</p>
Dimensions and weight:	428 (w) x 1030 (h) x 628 (d) 115 kg

TECHNICAL SPECIFICATIONS AND STANDARDS

Ambient characteristics	<p>Temperature limits: Ambient: 5...45 °C Storage: -20...+70 °C</p> <p>Humidity limits: Ambient: 5%...95% (R.H. non-condensing) Storage: 5%...95% (R.H. non-condensing)</p> <p>Altitude limits: <2000 m b.s.l.</p> <p>Pollution degree: “3” according to IEC664</p> <p>Protection degree: IP55 according to EN60529</p>
Conformity to Directives:	<p>MSD: 2006/42/EC LVD: 2014/35/EU EMC: 2014/30/EU WEEE: 2012/19/EU EC mark shows conformity to listed EU Directives</p>