Test, Measurement & Calibration Systems

- Standards, Systems, Software & Services

TEMPERATURE • PRESSURE • ELECTRICAL • MULTIFUNCTION • LEVEL • FLOW (WATER & GAS)
Nagman's wide range of Calibration Systems - Test Benches, Workstations, Bench-tops & Mobile Units - are designed & executed to serve as powerful tools for:

- Total Quality Management & ISO Conformance with Accuracies Traceable to International Standards
- Total Solution to all Calibration requirements

Thus these serve as an Essential / Integral part of Centralised / Distributed (Site) Calibration / Testing / Q.C. Laboratory Setups in all types of Industries.

Nagman's Calibration Systems - Test Benches, Workstations, Bench-tops & Mobile Units offer:

- ultimate Flexibility thro' Custom Configuration / Preferences enabling Incorporation/Integration of World's best - Furniture / Utility Modules / Calibration Standards and Test & Measuring Instruments

Nagman also offer Cost Effective / Economy / Budget Solution Calibration Test Benches / Workstations / Mobile Units / Bench-tops - a Complete & Comprehensive range, integrating / interfacing Nagman's own time tested, proven Temperature / Pressure / Multifunction Calibrator modules, Power Supplies & other Utilities etc.

With the wide choice & combination of Modules offered by Nagman, complete Calibration Systems for Dedicated / Single Parameter (Temperature / Pressure / Electrical & Electronics) or for Multiparameter - any combination of parameters can be Designed, Configured & “Built-up” to suit Customer's requirement.

Test Bench Designs include Elevated / Table-top Device Panels (Single / Dual Deck) with Movable Under-Bench Cabinets / Cupboards / Trolleys etc.

Hi-tech Next Generation “Multi-Flex” Range of Test Benches offer space saving / multi-purpose “Push-Pull” (Electrically operated) Pop-in/Pop-out Device panels & Mounted Under-bench Trolleys.

Nagman also can offer only Bench-tops for Mounting on Customer Tablo / Furniture.

Nagman offer - for Remote / Distributed Field / Site Calibration work Compact Mobile Units - combination of Modules & Utilities mounted in a sturdy Trolley case.

Nagman can offer these Test Benches / Bench-tops - one or more - mounted in a Van or Container to serve as “Mobile Calibration Lab” for Site / Field Calibration assignments.

Calibration Accuracies (of Instrument Modules) are Traceable to International Standards & duly verified (where possible) (before integration) & Certified by Nagman's NABL (equivalent to UKAS) Accredited - per ISO 17025:2005 - "Centre for Calibration".

Nagman offer these Systems - optionally - with their powerful & unique Calibration Management Software - Calman Plus - interfacing / integrating the various Modules & enabling perform Calibration Routines Semi-automatically / Automatically. Advanced Version of CMS for uplinking to customer SAP System also available.

More than 500 Systems are proving their mettle in industries & Projects Worldwide, thro' continued good performance.
**Basic Design & Dimension**

Work Table-tops are constructed from high density wood particle board of thickness 25 mm and covered / finished with non-reflective, dissipative antistatic (optional) matt finish plastic laminate, to meet the requirements for applications within the electronic industry. The surface of the worktop is resistive to impacts / discoloring / soldering marks & most of Chemical reagents.

**Eco-Frame**

Basic / Economy Version - High quality / Heavy Duty (＆ Powder coated) 40 mm square tube fabricated 4 or 5 legged Frame construction

**'C' Frame**

Trendy, Ergonomic / 'C' Frame Design

Metallic constructions, such as frames and angles are from degreased & phosphate treated Sheet Steel, protected with oven backed enamel paint, for better conductivity & dissipation of static charges, to ensure zero potential throughout the working surface.

Test Benches / Workstations are available in various dimensions, custom configurable (Lengths from 1000 upto 2400 mm x Depth 1000 mm x Height 900 mm), depending on modules fitted in Bench-top / Device Panel Units & to suit customers choice - possible to design & configure as per available space (area) of Customers’ Lab.

**Perfect Space Saving Solutions**

- Solutions for Space Saving “Corner Benches” - “L” shaped straight angle or with “Corner Working Area” - available as option to house
  - LCD Monitor in Bench-top
  - Tools in perforated back panel
  - CPU & Document Shelf under the Work Bench Cabinet to effectively use the Corner Space

**Multi-Flex**

Bench-tops & Device Panels

Bench-tops are designed to be mounted either on top of the Workbench, or in an Elevated position, with perforated sheet panel at the bottom (to accommodate tools, components storage boxes etc.). One additional (laminated board top) is provided (optionally) over the Device Panels, to place Portable Standards etc.

Device Panels (Modular designs) are made up of high quality Aluminium metal sheet of 3 mm thick, specially crafted (according to the Modules) and surface finished with Aluminium foil that gives an aesthetic look. The 19" chassis techniques permit changing the devices / Modules without any problems.

Single/Dual Deck Configuration (Based on number of Modules), 30" viewing angle adjustable (Single) Docks.

Under Bench Cabinets

Under Bench Cabinets (with 3 or 4 drawers of various heights), constructed in wood / steel, are provided with drawer guides and runners for smooth opening & closing. Cabinets are provided with central locking facility & castor wheels.

Cupboards / Cutouts

Cupboards (with/without Drawers) made up of Laminated Chip Board can be designed in the Device Panel to accommodate Primary Standards viz. Dead Weight Testers etc. Separate Cupboard provision for accommodating Manometers / Micro-Manometers is also possible.

For accommodating Portable Calibrators / Reference Standards in the Bench-top, suitable ‘Cutouts’ can be designed & provided.

Trolleys

Specially designed movable Trolleys, to mount Portable / Semi-portable Reference Standards like Temperature Calibrators, Dead Weight Testers etc. - that can be hidden under the Test Bench while not in use & can be easily moved to a convenient location for operations.

Electrically actuated / motorized (fixed under bench)
Pop-up Trolleys also available (Multi-Flex).

Other Accessories

Varieties of Workstation Accessories & Utilities including Articulated arm (for Lamp / Soldering Iron & Base, Telephone, PC Monitor etc.), Fluorescent Lamp, Shelves / Racks for PC, Keyboard Tray, Tool Stand attachment, Pick-up Boxes, Adjustable Auxiliary Tops (to accommodate loose Instruments, Tools, Circuit Diagrams etc.) to attach to the perforated panel.

Chairs are available to complete the Workstation as fully equipped Ergonomic System.

Ultimate Flexibility

In the pages to follow, Salient Features & Brief Specifications of the Standard / Optional Modules - Common/Utility Modules, Temperature/Pressure/ Electrical & Electronics Calibrator Modules, Test & Measuring Instrument Modules etc. are made available for Customer’s Choice / Selection, Design & Configuration of Dedicated Temperature/Pressure/Electrical & Electronics or Multifunction/Multiparameter Calibration Systems - Test Benches, Workstations, Bench-tops & Mobile Units. For complete Specifications, kindly contact us.

We also offer Test Benches / Field Test / Calibration Systems for Flow (Water/Gas), Level, Mass, Mechanical, Dimensional and other Applications incorporating Appropriate Calibration Masters / Standards.

100s of our Calibration Test Benches are being used in Centralized Test Facilities & ISO/IEC 17025 Accredited Calibration Labs across a Wide Spectrum of Industries around the world, providing these customers with high performance systems for the necessary applications.
Temperature Calibration Test Bench

Pressure Calibration (Primary / Secondary) Test Bench

Electrical & Electronics Calibration Test Bench

Multifunction / Multiparameter Calibration Test Bench
CALIBRATION SYSTEMS
TEST BENCHES • WORKSTATIONS • BENCH-TOPS • MOBILE UNITS

CHOICE OF COMMON MODULES & UTILITIES
MOUNTED IN DEVICE PANEL

Mains Power Supply - Single / Three Phase
Universal AC Power Supply - 230V (25A / 40A) 50 Hz / 60 Hz
Emergency ON/OFF Switch
Lamp Indication, Voltmeter
115V Single Phase Power Supply (optional)
415V Three Phase Power Supply (optional)

Variable AC Power Supply
Input Voltage: 230V AC
Output Voltage: 0 to 260V AC
Current Rating: 4A / 8A / 15A
Analog/Digital Voltmeter & Ammeter
One number of standard Power Socket with Lamp Indication Switch

Precision Digital Multimeter
5½ / 6½ digit Resolution
3 Hz ... 300 Hz AC Bandwidth
Null feature allows to remove Lead Resistance / Fixed Offsets
Min. / Max. / Avg. Readouts
Continuity & Diode Test

For other Module Types / Ratings / Specifications etc. consult us.

Multifunction Calibrator
Simultaneous Measurement & Simulation of:
- mV, V & mA
- Ohms, Frequency & Pulse
- Thermocouples & RTDs
- Basic DC Accuracy: 0.02% / 0.01%

Air Supply Modules - Pressure Panel^
Air Filter / Pressure Regulator
Ranges: 0 to 2.5 / 0 to 6 / 0 to 10 Bar/Kgf/Cm²
Dial Size: 63 mm
Accuracy: ±1.5%
Pressure Output Ports: Quick Fit Type

Air Supply Modules - Vacuum Panel^
Vacuum Regulator
Vacuum Gauge Range: -1 to 0 Bar
Dial Size: 63 mm / 100 mm
Accuracy: ±1.5%
Vacuum Output Ports: Quick Fit Type

^
* External Dry Compressed Air / Vacuum supply required
TEMPERATURE CALIBRATION TEST BENCH

Application

For work shop Calibration of varieties of Temperature Measurement & secondary devices including Sensors, Indicators, Thermocouple and RTDs Probes / Assemblies / Transmitters, Calibrators, Pyrometers (Infrared), Thermistors, Recorders, Switches and Controllers etc. in quick time. As this Work station is built-in with varieties of Modules, both Sourcing (simulation of Temperature through Dry-Blocks / Oil Baths / Black Body Sources) & Precise Measurement modules and offered with dedicated software, ‘CALTEMP’ Temperature Calibration became easy & fully Automatic, & hence the operator need not stand near by the system, to set each & every Measurement Points.

Industries / Sectors Served

Chemical, Petrochemical, Refineries, Power Generation (Thermal, Gas, Nuclear & Hydro), Oil & Gas, Manufacturing, Automation, Automotive, Aeronautics, Cement, Steel, Glass, Sugar & other Process Industries.
**Sub-Zero Temperature Calibrator**
- Model: MTC40 (Micro-Controller based)
- Range: -40 from Ambient to 123°C
- Resolution: ±0.1°C
- Accuracy: ±0.3°C, Stability: ±0.05°C
- Immersion Dia / Depth: 19 mm / 100 mm

**Micro Oil Bath**
- Model: MOB 250
- Range: 20°C above Ambient to 250°C
- Resolution: ±0.1°C
- Accuracy: ±0.6°C, Stability: ±0.2°C

**Low Temperature Dry Block Calibrator**
- Models: 350H / 350H2
- Range: 20°C above Ambient to 350°C
- Resolution: ±0.1°C
- Accuracy: ±0°C, Stability: ±0.3°C ±0.4°C
- Immersion Dia / Depth 25 mm / 110 mm

**Universal Low Temperature Calibrator**
- Models: MTC 350
- With Measurement Capability
- Range: 50 to 350°C; Resolution: ±0.1°C
- Accuracy: ±0.4°C, Stability: ±0.05°C
- Immersion Dia / Depth 25 mm / 110 mm

**Low Temperature**
- Model: BSSL
- Range: 10°C above Ambient to 350°C
- Stability: ±0.5°C, Resolution: ±0.1°C
- Accuracy: Within 0.5% of indicated temperature (Min. 1°C)
- Aperture Size: 25 mm Ø

**Medium Temperature**
- Model: BBSM
- Range: 20°C above Ambient to 600°C
- Stability: ±0.5°C, Resolution: ±0.1°C
- Accuracy: Within 0.5% of indicated temperature (Min. 2°C)
- Aperture Size: 25 mm Ø

**Low & Medium Temperature (Dual Chamber)**
- Model: BBSD
  - Simultaneous measurement of 2 Pyrometers / Quick Measurement in 2 Points over the range
  - Dual Ranges: 50 to 300°C & 250 to 600°C
  - Accuracy: Within 0.5% of indicated temperature (Min. 1°C in Chamber 1 & 2°C in Chamber 2)
  - Stability: ±0.5°C, Resolution: ±0.1°C
  - Auto-tune PID Temperature Controller
  - Aperture Size: 25 mm Ø

**Medium Temperature Dry Block Calibrator**
- Models: 650H / 650H2
- Range: 20°C above Ambient to 650°C
- Resolution: ±0.1°C
- Accuracy: ±0.5°C, Stability: ±0.5°C ±0.6°C
- Immersion Dia / Depth: 25 mm / 110 mm

**Universal Medium Temperature Calibrator**
- Model: MTC 650
  - With Measurement Capability
  - Range: 50 to 650°C; Resolution: ±0.1°C
  - Accuracy: ±0.6°C, Stability: ±0.05°C
  - Immersion Dia 25 mm & Depth 150 mm

**High Temperature Dry Block Calibrator**
- Model: 1200 HN
  - Stable high temperature source for calibration of multiple (upto 6) Sensors at high temperature
  - Range: 300 to 1200°C; Resolution: ±1°C
  - Accuracy: Better than ±0.5°C
  - Stability: Better than ±0.5°C
  - Immersion Dia / Depth: 45 mm / 150 mm

**High Temperature Dry Block Calibrator**
- Model: MTC 1200
  - Portable Model with Measurement Capability
  - Range: 300 to 1200°C
  - Resolution: ±1°C
  - Accuracy: ±2°C
  - Stability: ±0.5°C
  - Immersion Dia / Depth: 25 mm / 150 mm

**Metrological Dry Block Calibrator**
- Model: Metalcal 650
  - With Measurement Capability
  - Range: 50 to 650°C; Resolution: ±0.01°C
  - Accuracy: ±0.4°C, Stability: ±0.04°C
  - Immersion Dia 30 mm & Depth 150 mm
  - Axial Uniformity: ±0.4°C
  - Radial Uniformity: ±0.04°C

**Temperature Scanner**
- 6 Point Calibration
- Simultaneous Calibration of upto 6 Thermocouples or RTDs
- Reduces Calibration Time by 1/6th
- Serves as an Interface Module for Multi-Hole Dry Block Temperature Calibrators

**Working Standard RTD / TC Probes**
- RTD
  - Type Pt100: Range -45 to 650°C
  - Thermocouple Probes
  - Type K: Range -300 to 1200°C
  - Type S: Range -650 to 1800°C
- Supplied loose in wooden case

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**TEMPERATURE CALIBRATION TEST BENCH**

**CHOICE OF MODULES & UTILITIES**

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**Mobile Trolley**
**Application**

Primary Standard & Secondary Standard Pressure Calibration Test Benches - specially designed for Primary Level / Precision Calibration & Testing of Pneumatic, Electro-Pneumatic & Hydraulic Pressure Instruments.

These Test Benches Calibrate Gauges, Calibrators, Transducers, Transmitters, Indicators, Switches, Valves I/P, P/I Converters, etc. – both Hydraulic & Pneumatic.

**Industries / Sectors Served**

Chemical, Petrochemical, Refineries, Power Generation (Thermal, Gas, Nuclear & Hydro), Oil & Gas, Manufacturing, Automation, Automotive, Aeronautics, Cement, Steel, Glass, Sugar & other Process Industries.
PRESSURE CALIBRATION TEST BENCH

PRIMARY STANDARDS

DEAD WEIGHT TESTERS (HYDRAULIC)
- RAM Screw Pump Design (Oil operated)
- Bulb Pump
- Ranges: 1200 Bar
- Single or Dual Platen
- Accuracies (Reading):
  - ±0.1% (H3000 Series)
  - ±0.05% (H6000 Series)
  - ±0.025% (H8000 Series)
  - ±0.015% (H9000 Series)
- Units: Bar or PSI or Kg/cm²
- Mounted on table-top or on a Trolley (under bench)

SECONDARY STANDARDS

MANOMETERS
- Single Limb Manometers used as Primary Standard for Low Pressure Vacuum & Medium Pressure Measurement (Water/Mercury filling)
- Ranges:
  - 0 to 1000 mmWC
  - 0 to 800 mmHg (1000 mBar)
  - 0 to 25 psi (0 to 1500 mBar)
- Resolution: 1 mm
- Typical Accuracy: ±0.1% F.S., ±1 mmWC
- Mounted in ‘Trolley’ cupboard

MICRO-MANOMETERS
- Primary Standard Micro-Manometer for very Low Pressure Differential Pressure & Precision Measurement
- Range: -50 to 2500 / 5000 Pascal
- Resolution: 1 Pascal
- Typical Accuracy: ±0.4% F.S.
- Mounted in Trolley cupboard

DIGITAL PRESSURE INDICATOR WITH EPM
- MPC-B / MPC-B+
- Ranges:
  - ±0.5% ±0.25% ±0.1% ±0.05% (Pneumatic)
- 0 to 700/2000 Bar to 1 Bar
- Internal/External Pressure Modules
- Accuracy: ±0.05% ±0.025% ±0.01% ±0.005% FS (Temperature compensated)
- Selectable Pressure Units thru Keypad
- High Resolution Graphic Display
- DC Current / Voltage Measurement: Upto 50 mA/30V
- Switch Test Facility & Zero Offset Facility
- Pressure Input Ports; Quick Fit Type

DIFFERENTIAL/ABSOLUTE/GAUGE PRESSURE INDICATOR
- For measurements of Gauge, Vacuum & Differential Pressure or Absolute Pressure
- Ranges:
  - 0 to 2000 mBar upto 90 Bar
- Typical Accuracy: ±0.05% ±0.1% ±0.2% F.S.

MIMIC PANEL
- For reading Micromanometers / Manometers & Low Pressure / Vacuum Gauges / Indicators
- Low Pressure & Vacuum Source
- Integral Pump & Verifier Valve for Filling of Pipes
- Pressure Range:
  - 0 to 2 Bar/Sensitivity: 0.05 mBar
  - 0 to 0.6 Bar/Sensitivity: 0.05 mBar

SET OF ANALOG PRESSURE / VACUUM GAUGES
- Bourdon Type
- Dial Size: 160 mm / 250 mm
- Ranges:
  - Pressure Gauge: Upto 700 Bar/Kg/cm²
  - Vacuum Gauge: 1 to 0 Bar (Std. DIN Ranges)
- Accuracy: ±0.25% ±0.5% ±0.1% F.S.
- Panel Mounted
- Pressure Input Ports: Quick Fit type

MANIFOLDS
- For Mounting / Testing of Multiple Gauges / Devices
  - 2/4 Gauge Manifolds (Tabletop)
  - Material: Stainless Steel
  - Connecting Hoses with End fittings (optional)
  - Threaded Unions (to suit)

COMPARISON TESTER (Hydraulic)
- GCL/GCH Series
- Ranges:
  - GCL Series: Upto 250 Bar
  - GCH Series: Upto 1400 Bar
  - Work Screw Pump Design
  - Isolating Valve & Priming Pump
  - Mounted on a Trolley (Under Bench)

CHOICE OF MODULES & UTILITIES

STAND-ALONE UNITS

PNEUMATIC HAND PUMPS
- Ranges: 0.9 to 2 / 10 / 25 / 40 Bar
- Resolution: 0.5 mmWC / 1 mBar
- Pressure / Vacuum Changeover selection
- PHP 2
- PHP 10 / 25 / 40

HYDRAULIC HAND PUMPS
- Ranges: upto 200 / 350 / 700 / 1000 Bar
- Transparent Reservoir
- Medium: Oil
- Fine Adjustment Vernier
- All Hand Pumps are supplied with Pneumatic / Hydraulic Hose & Quick Release Coupling Connectors as standard.
Application

These Test Benches are useful for Calibration & Testing of Electrical & Electronic Instruments and equipments including V/A Meters, Multimeters, AC/DC Signal Sources, Clamp Meters, Tachometers, Ohmmeters, Decade Boxes, Power Supplies, Multi-function Calibrators, Frequency / Signal Generators, Oscilloscopes, Frequency Meters, Timer Counters etc.

Industries / Sectors Served

Chemical, Petrochemical, Refineries, Power Generation (Thermal, Gas, Nuclear & Hydro), Oil & Gas, Manufacturing, Automation, Automotive, Aeronautics, Cement, Steel, Glass, Sugar & other Process Industries.
**ELECTRICAL & ELECTRONICS (SIGNAL) CALIBRATION TEST BENCH**

**Loop Calibrators**
- Capability to Measure & Simulate Voltage & Current & Frequency
- 5 digits display for Measurement & 6 digits display for Simulation
- Capability to perform Continuity Test & provide Loop Supply (24 V) for Transmitters
- Dual Liquid Crystal Display with white LED for Backlight

**Thermocouple Calibrator**
- Measurement & Simulation of:
  - Voltage: 100 mV
  - Thermocouple: Types R, S, B, E, K, J, T & N
- Selectable Temperature Output Readings (in °C/°F)

**RTD Calibrator**
- Measurement & Simulation of:
  - RTD Types: Pt100: -200 to 850°C, Cu50: -50 to 150°C
  - Resistance: 400 Ω

**Multifunction Calibrator**
- Simultaneous Measurement & Simulation of:
  - mV, V & mA
  - Ohms, Frequency & Pulse
  - Thermocouples & RTDs

**Digital LCR Meter**
- High Resolution
- Zero Adjustment
- 3 Function LCR Measurement (Capacitance, Inductance & Resistance)

**Frequency Counter**
- 1 Hz to 120 MHz range
- 8 digits Display (0.3" LED)
- Overflow Indicator
- 15m Vrms High Sensitivity
- 5 ppm High Stability Timebase
- Low Pass Filter Function

**Function Generator**
- Range: 0.5 Hz to 5 MHz
- Single, Triangle, Square, Ramp
- TTL & CMOS Output

**Soldering / De-soldering Station**
- Temperature Control:
  - Soldering / Desoldering: 50°C to 450°C
  - Hot Air Gun: 50°C to 550°C
- Complete with Soldering Iron Set:
  - Hot Air Pencil / Nozzle, Support Rack
  - Antistatic / ESD

**Voltage & Current Source (AC/DC)**

**Decade Resistance Box**

**Three Phase Multifunction Power Tester**

**Variable DC Power Supply**

**Programmable DC Power Supply**

**Digital Storage Oscilloscope**
- 80/100 MHz Bandwidth
- Dual Sampling Mode
- 4000 Points Memory
- Length per Channel: 50" TFT Colour Display
Application

Our Multifunction / Multi-parameter Calibration Test Benches are widely used for Testing & Calibration of variety of Temperature, Pressure & Electrical / Electronic parameters - all Instruments mounted in a single workstation.

Automatic Testing & Calibration of Test & Measuring instruments can be performed by integrating our powerful “Calmen” Software.

Industries / Sectors Served

Chemical, Petrochemical, Refineries, Power Generation (Thermal, Gas, Nuclear & Hydro), Oil & Gas, Manufacturing, Automation, Automotive, Aeronautics, Cement, Steel, Glass, Sugar & other Process Industries.
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<td><strong>Mains Power Supply - Single / Three Phase</strong></td>
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<tr>
<td>Universal AC Power Supply</td>
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<tr>
<td>230V (20A / 40A), 50 Hz / 60 Hz</td>
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<tr>
<td>Emergency ON/OFF Switch</td>
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<tr>
<td>Lamp indication, Voltmeter</td>
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<tr>
<td>115V Single Phase Power Supply (optional)</td>
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<td>415V Three Phase Power Supply (optional)</td>
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<tr>
<td><strong>Fixed DC Power Supply</strong></td>
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<td>Supply Voltage : 230V AC</td>
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<tr>
<td>Output : 5V / 12V / 24V / 48V, 2A / 5A / 10A</td>
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<tr>
<td>Banana Socket</td>
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<tr>
<td>Digital Volt / Ammeter</td>
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<tr>
<td><strong>Programmable DC Power Supply (Variable)</strong></td>
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<tr>
<td>Programmable Voltage / Current</td>
</tr>
<tr>
<td>a) 0 to 36V DC / 3A</td>
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<tr>
<td>b) 0 to 72V DC / 1.5A</td>
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<tr>
<td>Constant Voltage &amp; Constant Current Mode</td>
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<tr>
<td>Single Output</td>
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<tr>
<td><strong>Precision Digital Multimeter</strong></td>
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<tr>
<td>5½ / 6½ digit Resolution</td>
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<tr>
<td>3 Hz... 300 Hz AC Bandwidth</td>
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<tr>
<td>Null feature allows to remove Load Resistance / Fixed Offsets</td>
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<td>Min / Max / Avg. Readouts</td>
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<td><strong>Function Generator</strong></td>
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<td>Range : 0.5 Hz to 5 Mhz</td>
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<td>Single, Triangle, Square, Ramp</td>
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<tr>
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<td><strong>Air Supply Modules - Pressure Panel</strong></td>
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<td>Air Filter / Pressure Regulator</td>
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<tr>
<td>Ranges : 0 to 2.5 / 6 / 10 Bar/mm²</td>
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<tr>
<td>Dial Size : 83 mm / 100 mm</td>
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<td>Accuracy : ±1.6%</td>
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<td>Pressure Output Ports : Quick Fit Type</td>
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<td><strong>Air Supply Modules - Vacuum Panel</strong></td>
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<tr>
<td>Vacuum Regulator</td>
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<tr>
<td>Vacuum Gauge Range : -1 to 0 Bar</td>
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<tr>
<td>Dial Size : 63 mm / 100 mm</td>
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<td>Vacuum Output Ports : Quick Fit Type</td>
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<tr>
<td><strong>Digital Pressure Indicator with EPM</strong></td>
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<tr>
<td>Ranges : 0.65 up to 40 Bar (Pneumatic);</td>
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<tr>
<td>0 upto 100 / 1000 Bar through one or more internal / External Pressure Modules</td>
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<tr>
<td>Accuracy : ±0.05% / ±0.025% FS</td>
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<tr>
<td>Selectable Pressure Units thru' Keypad</td>
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<td>High Resolution Graphic Display</td>
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<td><strong>Thermocouple Calibrator</strong></td>
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<td>Measurement &amp; Simulation of</td>
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<tr>
<td>- Voltage : ±100 mV</td>
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<tr>
<td>- Thermocouple : Types R, S, B, E, J, K, T &amp; N</td>
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<tr>
<td>Selectable Temperature Output Readings (in °C/°F)</td>
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<td><strong>RTD Calibrator</strong></td>
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<td>- RTDs, RTDs, Resistances &amp; DC Voltages</td>
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<td>Dual LCD with white LED for backlight</td>
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</tr>
<tr>
<td>Capability to perform Continuity Test &amp; provide Loop Supply ( ±2 V ) for Transmitters</td>
</tr>
<tr>
<td>Dual Liquid Crystal Display with white LED for Backlight</td>
</tr>
<tr>
<td><strong>Multifunction Calibrator</strong></td>
</tr>
<tr>
<td>Simultaneous Measurement &amp; Simulation of</td>
</tr>
<tr>
<td>- mV, V &amp; mA</td>
</tr>
<tr>
<td>- Ohms, Frequency &amp; Pulse</td>
</tr>
<tr>
<td>- Thermocouples &amp; RTDs</td>
</tr>
<tr>
<td><strong>Sub-Zero Temperature Calibrator</strong></td>
</tr>
<tr>
<td>Micro-Controller based</td>
</tr>
<tr>
<td>Range : -40 to Ambient to 120°C</td>
</tr>
<tr>
<td>Resolution : ±0.1°C</td>
</tr>
<tr>
<td>Accuracy : ±0.2°C</td>
</tr>
<tr>
<td>Stability : ±0.05°C</td>
</tr>
<tr>
<td>Immersion Dia : 19 mm</td>
</tr>
<tr>
<td>Immersion Depth : 100 mm</td>
</tr>
<tr>
<td><strong>Low Temperature Dry Block Calibrator</strong></td>
</tr>
<tr>
<td>350H / 350HZ</td>
</tr>
<tr>
<td>Range : 20°C above Ambient to 350°C</td>
</tr>
<tr>
<td>Resolution : 0.1°C</td>
</tr>
<tr>
<td>Accuracy : ±1°C</td>
</tr>
<tr>
<td>Stability : ±0.5°C</td>
</tr>
<tr>
<td>Immersion Dia : 25 mm</td>
</tr>
<tr>
<td>Immersion Depth : 110 mm / 130 mm</td>
</tr>
<tr>
<td><strong>High Temperature Dry Block Calibrator</strong></td>
</tr>
<tr>
<td>1200 HN</td>
</tr>
<tr>
<td>Stable high temperature source for calibration of multiple (upto 6) Sensors at high temperature</td>
</tr>
<tr>
<td>Range : 300 to 1200°C; Resolution : 1°C</td>
</tr>
<tr>
<td>Accuracy : Better than ±3°C</td>
</tr>
<tr>
<td>Stability : Better than ±0.5°C</td>
</tr>
<tr>
<td>Immersion Dia : 45 mm</td>
</tr>
<tr>
<td>Immersion Depth : 150 mm</td>
</tr>
<tr>
<td><strong>Soldering / Desoldering Station</strong></td>
</tr>
<tr>
<td>Temperature Control</td>
</tr>
<tr>
<td>Soldering / Desoldering : 80 to 480°C</td>
</tr>
<tr>
<td>Hot Air Gun : 50 to 550°C</td>
</tr>
<tr>
<td>Complete with Soldering Iron Set : Hot Air Pen / Nozzle, Support Rack</td>
</tr>
<tr>
<td>Antistatic / ESD</td>
</tr>
<tr>
<td><strong>Decade Resistance Box</strong></td>
</tr>
<tr>
<td>Accuracy 0.05% - 4, 6, 7 &amp; 8 decade models</td>
</tr>
<tr>
<td>- Range 11.111 MΩ</td>
</tr>
<tr>
<td>Megohm Decade Boxes : 100 KΩ to 1000 MΩ</td>
</tr>
<tr>
<td>High Resistance Box : 9 Decades</td>
</tr>
<tr>
<td>- Range 1 KΩ to 600 GΩ, 500V Rating</td>
</tr>
<tr>
<td>Capacitance Box : 5 Decades</td>
</tr>
<tr>
<td>- Range 10 pf to 11.11 mF</td>
</tr>
</tbody>
</table>

* Modules & specifications are indicative. Actual Specifications will vary depending upon the Module.
MOBILE CALIBRATION SYSTEM / MARINE TRAINER KIT

MOBICAL SERIES

Temperature, Pressure and/or Electrical & Electronics Modules mounted in rack, placed inside Mobile (sturdy) Trolley case, ready for use as Table-top Unit.

TYPICAL CONFIGURATION OF MODULES

Electrical & Electronics

Mobical EE
- Function Generator
- 5½ digit Digital Multimeter
- Multifunction Calibrator
- Decade Resistance Box
- Variable AC & DC (Programmable) Power Supplies
- Power Supply for Unit Under Test

Typical Systems supplied to Goa Shipyard Ltd. (7 Nos.)

Pressure & Temperature

Mobical PT
- Pressure Indicator
  Pneumatic : -0.85 to 25 Bar & Hydraulic : Upto 350 Bar
- Built-in / External Hand Pumps
- Dual Dry Block Temperature Calibrators
- Range : -35 from Ambient to 123°C & 50 to 350°C
- Multifunction Calibration & Power Supply for Unit Under Test

For Module details, refer previous pages

Multi-parameter Trainer
(Electrical, Electronics, Pressure & Temperature)

Mobical PTES
- Dry Block Temperature Calibrators (2 Nos.)
  Range : -35 from Ambient to 123°C & 50 to 350°C
- Function Generator
- 5½ digit Digital Multimeter
- Process (Multifunction) Calibrator
- Decade Resistance Box
- Variable AC & DC Power Supply for Units Under Test
- Integrated / Interfaced with CPU & foldable Touch Screen Monitor
  CALMAN Plus - Calibration Management Software for Automatic / Semi-Automatic Test / Calibration routines; Data Collection / Storage etc.
FLOW & LEVEL CALIBRATION SOLUTIONS

PROCESS FLOW METER CALIBRATION SYSTEM

FLOCAL Series

Typical Calibration Lab Installation (up to DN 150)

Basic Calibration, using 0.2% Traceable Calibration Accuracy Master Flow Meter in 'Comparison' (Master/Slave) Mode (One or more Masters, based on the Flow Ranges /Sizes of UUT).

Calibration Accuracy Enhancement (Uncertainties upto 0.2%) thro' Gravimetric (Collection Chamber Mounted on Precision Weigh Scale) & or Pre-Calibrated Volume Chambers (for Low Volumes).

WATER METER CALIBRATION SYSTEM

WATCAL Series

• Different systems to suit Domestic / Industrial / Bulk Water Meters - (Mechanical, Electrical, Ultrasonic etc.).
• Calibration of Multiple Meters/Sizes : DN 10 to DN 40 to DN 300 in 1 or more lines
• Test/Calibration Methods per ISO 4064/3 Standards:
  - Gravimetric : Collection Chamber(s) mounted on Weighing Scale(s)
  - Volumetric : thro' pre-calibrated Volume Chambers
• Precise flow adjustment using Rotameters / Electro-Magnetic Flow Meters
• One or more pumps to suit (with VFD / Manual Throttle for Flow Control)
• Clamping : Manual / Pneumatic / Hydraulic etc.
• Flow Rates :
  - 1 LPM to 335 LPM (for Domestic Water Meter)
  - 10 LPM to 1500 M³/Hr (for Industrial Meter)

GAS METER CALIBRATION SYSTEM

(Bell Prover Type)

GASCAL Series

• A Boon for Calibration of Domestic Gas Meters - OEMs, Hotels, Hospitals & R&D Institutions.
• Flow Rates : 0.018 to 6 Cu.M/Hour
• Suitable for Gas Meter Sizes :
  - G1.6, G2.5, G4, G6
• Bell Prover : Capacity 20/100/200 Litres
• Accuracy : ±0.2% & ±0.5% (Traceable to ISO/IEC 17025 Accredited Laboratory).
• Upstream/Downstream Pressure & Temperature Measurement
• D.P. Gauges (for measurement of pressure loss) : 0 to 1.0 inch of Water (0 to 250 Pa)
• Meter Clamping : Pneumatic
• Simultaneous Calibration of multiple Meters (Provision to mount 2/4/6/8 Meters)

Consult us for higher capacity Bell Provers for Calibration of Industrial / Bulk Meters.

LEVEL CALIBRATION SYSTEM

LTR / LCS Series

For Primary, Interface & Total Liquid Testing & Calibration of various Types / Models of
Level Measurement & Control Devices
including
- Float / Displacer / Radar / Capacitance / Ultrasonic / Magnetic
- both Inbuilt & External Chamber types.

For more detailed specifications/catalogs, kindly write to us.
Portable/ Table-top Calibrators & Accessories - at a glance...

**Sub-Zero to High Temperature**

- **MTC Series**
  - **MTC 40** -40°C above Amb. to 123°C; Accuracy: ±0.3°C
  - **MTC 350** 50 to 350°C; Accuracy: ±0.4°C
  - **MTC 650** 50 to 650°C; Accuracy: ±0.6°C
  - **MTC 1200** 300 to 1200°C; Accuracy: ±0.2°C

**Low & Medium Temperature**

- **Heavy Duty Model**
  - **350H** 10°C above Amb. to 350°C, Accuracy: ±1.0°C
  - **650H** 20°C above Amb. to 650°C, Accuracy: ±1.5°C

**Medium Temperature**

- **Economy Model**
  - **ETC 600** 50°C to 600°C, Accuracy: ±0.1% F.S.
  - **ETC 600-2** 50°C to 600°C, Accuracy: ±0.15% F.S.

**Micro Oil Bath**

- **MOB 250**
  - 20°C to above Ambient to 250°C
  - Accuracy: ±0.6°C, Stability: ±0.2°C

**High Temperature**

- **1200 HN**
  - 300°C to 1200°C. Accuracy: Better than ±3°C

**Low, Medium & High Temperature**

- **Black Body Calibration System**
  - **BBSL** 10°C above Ambient to 350°C
  - **BBSM** 20°C above Ambient to 600°C
  - **BBSH** 500°C to 1200°C

Photos included are typical models - actual supplies/ executions will vary.
Hand Pumps

Pneumatic & Hydraulic

PHP Series

Pneumatic:
-0.90 Bar Vacuum to 2 bar upto 40 Bar
Hydraulic:
- 0 to 200, 350, 700 & 1000 Bar
Oil / Water operated.

Handheld Pressure Calibrators

MPC / MPCE Series

Pneumatic:
-0.85 to 2 upto 40 Bar
Hydraulic:
- 0 to 70 / 700 Bar
Accuracies:
±0.1%, ±0.05%, ±0.025% F.S.

Portable Pressure Calibrators

PPC Series

Pneumatic:
-0.85 to 2 upto 20 Bar
Hydraulic:
- 0 to 200 / 400 Bar
Dual Model
Pneumatic:
-0.85 to 20 Bar & Hydraulic:
- 0 to 400 Bar
Accuracies:
±0.05%, ±0.025% F.S.

Dead Weight Testers

Pneumatic & Hydraulic

Pneumatic:
-0.1 to 35 Bar
Accuracy:
±0.1%, ±0.05%, ±0.025%, ±0.015% Reading
Hydraulic:
Upto 1200 Bar

Comparison Testers

Ranges: Upto 1400 Bar
Screw & Hand Pump Models
Oil / Water Operated

Signal Calibrators

Ti/C, RTD & Loop

Ideal for quick Loop Checking & Calibration of Transmitters, Simulation / Measurement of mV & mA

Photos included are typical models - actual supplies / executions will vary
CALIBRATION MANAGEMENT SOFTWARE

CALMAN Plus

The Nagman's Calman Plus (Calibration Management) Software is a powerful tool for calibration of devices in the process industries under the present day quality guidelines such as ISO 9001. The Calman Plus automates the process of calibration making them quicker & easier.

This Software has been developed with our experience/knowledge of the Calibration Softwares of the various reputed International Manufacturers & in the current stage of development, Calman Plus Software supports, in addition to Nagman’s own range of Temperature, Pressure & Signal Calibrators, several world brand Calibrators, Test & Measuring Instruments & enables perform Semi-Automatic/Automatic Calibration & Certificate Generation. Our motto was “to develop a single Software which could communicate with diverse instruments” making Automatic Calibration user friendly, simpler & easier.

In addition to these listed Instruments, Nagman has the capability to develop Drivers for other Make/Model Calibrators/Instruments.

Features

— Capable of storing all information of Field Instruments in a single Database
— Stores individual calibration information of instruments
— Communicates with many Instruments using RS-232 Serial Bus, also option available to calibration instruments without Serial Interface-Manually
— Maintains history of Calibration Records
— Calibration Reports in compliance with ISO 9001
— Calibration due date reminder
— Printing of User Definable Calibration Reports
— Compatible with Microsoft Windows Platform
— Powerful Graphical Presentation
— All Screens in full colour/Help Screens
— Modular & Expandable
— Simultaneous Calibration of Temperature, Pressure or Electrical / Signal Calibrators (optional)

The Calman Plus Software Package built on Modular concept offers utmost flexibility enabling the user to choose any combination from world’s leading brand Calibrators with possibility of future Add-ons (per user requirement) on Modular basis!

The unique feature of Calman Plus with ability to communicate with diverse instruments helps to save considerable cost on investment and being a single dedicated programme reduces chances for confusion / mistakes during calibration.

The historical data storage format of Calman Plus helps the User to ascertain the performance of the instrument over a period of time and enables him/her to fix-up optimum recalibration intervals for instruments.

Calman Plus has the capability to integrate the entire Calibration System in a Plant & uplink to the Centralized ERP System.
CALMAN Plus

System Interfacing Diagram

Pressure Calibrator/Controller
Hand Pump
Pressure Gauge (Unit under Test)

Pressure Gauge Calibration

Nagman Pressure Calibrators
Handheld Manometer
Pressure Calibrator/Controller
Hand Pump (for Pressure generation)
Pressure Gauge (Unit under Test)

Pressure Transmitter Calibration

Nagman Pressure Calibrators
Digital Multimeter
Pressure Calibrator/Controller
Hand Pump (for Pressure generation)
Pressure Transmitter (UT)

Temperature Sensor / Transmitter Calibration

Nagman Temperature Calibrators
Digital Multimeter
MultiFunction Calibrator
RTD / Thermocouple

Caltemp is a dedicated simple & cost effective Temperature Calibration Software which supports Semi-Automatic & Manual Calibration.

Supported Models:
650H, MOB 250, FB-06L/S, 1200 HN & 1500 HN.

Calpress is a dedicated & cost effective Calibration Software which enables & supports Semi-Automatic & Manual Calibration

Supported Models:
MPC, MPC-E & PPC Series


Supported Models:
MTC 49, MTC 650 & MTC 1200

Metcal is a dedicated & cost effective Calibration Software designed specially for Model

Above listed Calibration Softwares are Windows based & has excellent provisions for calibrating, data logging and managing your calibration data.
CENTRE FOR CALIBRATION

The Centre for Calibration (CFC) is an “Independent Profit Centre”, - Unit of Nagman Instruments & Electronics (P) Ltd., Chennai, a pioneer and leader in the Calibration field in India.

Having manufactured and sold over 30,000 Calibrators, 500+ Dead Weight Testers & 600+ Calibration Test Benches, Nagman understands Calibration at its best and have designed the Centre to serve the diverse Calibration requirements of Large, Medium, Small Scale Industries-Effectively and Comprehensively.

The Centre is equipped with sophisticated Calibration Equipments both Primary & Working / Transfer Standards which are traceable to National & International Standards. Facility includes Computerized Automatic Calibration & Report generation conformance to ISO Standards.

Nagman “Centre for Calibration” offers a wide range / variety of CALIBRATION related Services covering most Process Parameters & serves almost every type of Industry / Institution / Establishment.

Nagman Centre for Calibration, Chennai enjoys the unique distinction of obtaining NABL Accreditation (as per ISO / IEC 17025:2005 Standards) simultaneously for Thermal, Mechanical (Pressure / Mass / Linear), Electro-Technical, Dimensional & Flow Parameters.

NABL Accreditation for Sub-Centre

Nagman Sub-Centre at Mumbai is offering NABL Accredited Calibration Services (as per ISO/IEC 17025:2005 Standards) simultaneously for 3 parameters - Thermal, Mechanical (Pressure / Mass / Linear), & Electro-Technical.

Nagman “Centre for Calibration” is staffed with qualified & well trained Team Leaders & Engineers in Laboratory Management, Internal Auditing and Proficiency Testing.

Training Workshops on “Calibration Techniques” are conducted periodically at Nagman’s Lab at Chennai as well as at customer locations.

SERVICES OFFERED

Laboratory Calibration
Including “Express” - same day Calibration

Site Calibration
During Plant Shutdown / Routine Maintenance / Commissioning / Performance Trials

Mobile Calibration Laboratory
Calibration Service at your door steps

Annual Maintenance Contracts
Periodic visits on preplanned dates

Comprehensive Calibration Job Packages
Including Mobilization of Master Standards, Manpower etc.

Consultancy Services
For Setting up Calibration Lab & obtaining Accreditation

Calibration Workshops / Training
Structured Training in Calibration Techniques for Technicians / Engineers / Managers - at our Centre or Customer’s facility.

Calibrator Rentals (first time in India)
A wide variety of Portable Calibrators, Transfer Standards, Simulators, Dead Weight Testers etc. - a boon to Project Consultants / Executants / Erection & Commissioning Contractors.

Now at CHENNAI & MUMBAI
FLUID FLOW CALIBRATION LABORATORY

Nagman, in its constant endeavour to enhance its calibration capabilities, has recently ventured into offering Fluid Flow Calibration Services for Process Industries in India.

We are pleased to advise that this Laboratory is Accredited by NABL, Delhi for performing Recalibration Services (as per ISO/IEC 17025:2005 Standards).

Flow Meter Calibration Methods:

Comparison / Gravimetric

Types of Process Flow Meters that can be calibrated:

Turbine, Vortex, Coriolis Mass, Electro-Magnetic, Ultrasonic etc.

Accuracy: ±0.2% Reading

Flow Lab:

- Liquid Mass Flow Rate: Max. 300 TPH, CMC: 0.15%
- Liquid Volume Flow Rate: Max. 360 M³/h, CMC: 0.2%
- Quantity of Mass: Max. 5000 Kg, CMC: 0.04%
- Quantity of Volume: Max. 5 M³, CMC: 0.15%
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Specifications subject to change owing to continuous development. Kindly contact us for latest catalogues/price lists.