

# Teledyne Falcon GC

## Ultrafast Gas Chromatograph



# The Falcon Series Ultrafast Gas Chromatograph

## Faster

With analytical cycles 10 to 50 times faster than traditional chromatographs, the Falcon Series Ultrafast Gas Chromatograph vastly increases responsiveness for the data consumer in a wide range of lab, process and field applications. Less time is spent waiting on results which means more productivity and timely control of measured processes. Product output, quality and profitability are increased while field analysis becomes more practical and reliable.

The Falcon Series GC's incredible speed inspired a new Ultrafast Simulated Distillation Method. The ASTM D7798 method can perform simulated distillation nearly 6 times faster than the previous method (D2887), with superior repeatability and reproducibility.

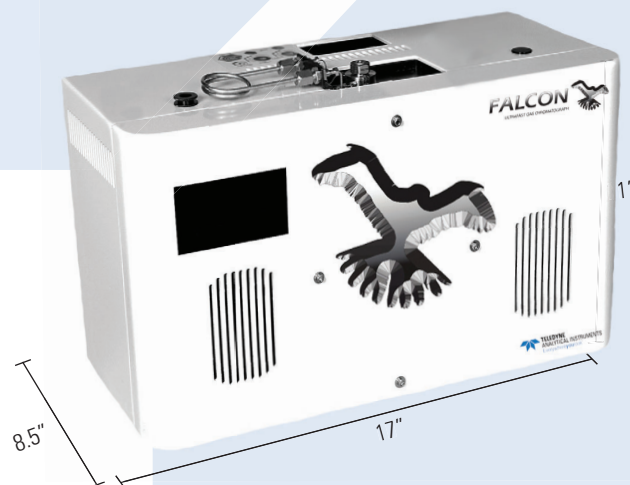
## Smaller

With the elimination of the air bath column ovens, required for traditional gas chromatography, the Falcon Series GC footprint is drastically reduced. Yet, the Falcon Series delivers all the functionality of much larger, higher thermal mass, traditional GCs. At 17" wide, 8.5" deep, 11" high and 25 Lbs (43 cm x 22 cm x 28 cm & 11kg), the Falcon Series offers advanced analytical chemistry in a highly compact, versatile package.

The smaller size of the Falcon Series GC means more efficient utilization of space and, ultimately, bigger profits for the user. The small Falcon Series footprint allows for higher installation density in the laboratory and enables process installation schemes that place the analyzer much closer to its sampling point in the plant. Closer proximity means less sample lag time as well as more representative measurements for process control. This also makes hand carried and vehicular transport applications far more feasible.

## Smarter

Using modern computing with standard operating systems and software, the Falcon Series GC frees valuable technical resources from the daily grind of interpreting and validating chromatographic results. State-of-the-art Chromperfect® GC operating software is built in and LineUp™ software virtually eliminates misidentification and components and drastically reduces the need for expensive calibration sample runs. Less time spent calibrating the analyzer means more time spent on more economically valuable diagnostics, most notably measured process deviations from the set-point. In addition to Chromperfect®, Infometrix Pirouette® is an optional software that may be added to enable interface with process automation.



# is Faster, Smaller, Smarter, Easier and Greener

## Easier

Teledyne's patented direct heating of the temperature-programmed column modules allow the Falcon Series GC to avoid the complicated and troublesome valve schemes used in isothermal process analyzers and many lab gas chromatographs. The Falcon Series GC's patented overall modular design also makes diverse application engineering and maintenance easier, as column and detector modules are readily changed out as needed.

Correlation between laboratory systems and online process control systems become realistically possible with the Falcon Series system, because both physical packages use the same measurement principle, hardware and methodology. Applying the Falcon Series GC in-lab and online means less time spent reconciling lab and process measurements and validating which result is correct. More time can be spent working on valuable, direct process optimization.

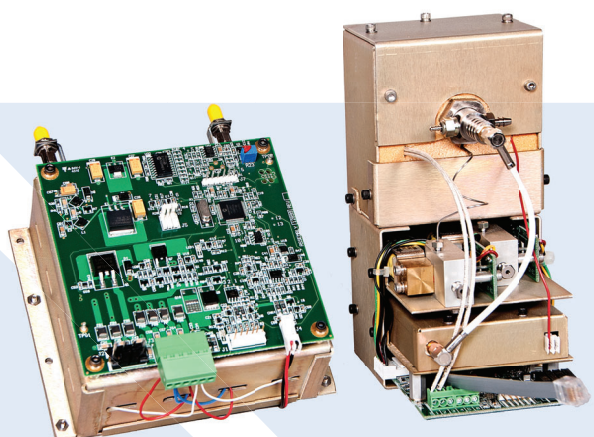
## Greener

The obvious and extraordinary features and benefits of the Falcon Series GC combine to yield something that may not be that evident: Green Process Analytical Chemistry. The Falcon Series GC is greener, whether in the control laboratory, online in the processing plant, near line in the pilot plant or when transported for field measurements. By consuming less than 300 Watts in operation, the Falcon Series GC uses about 1/10th of the power of traditional GCs.

With analytical cycles that are many times faster and the low electrical load needed for operation, the Falcon Series GC's power consumption per analysis is 1% or less of the energy required by traditional gas chromatography. Combine these savings with the reduction in workload for air conditioning systems and the Falcon Series solution is greener still. The Falcon Series product life cycle environmental impact from manufacturing throughout its useful lifetime to disposal is far less than traditional GCs.

## The Result

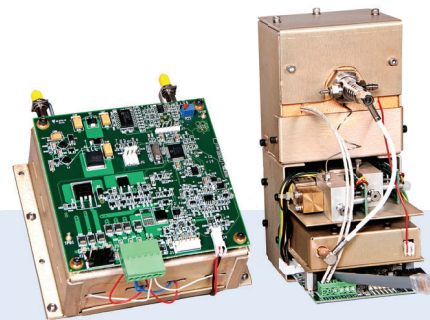
Faster, Smaller, Smarter, Easier, Greener = better quality, increased productivity, profitability and versatility, with far less hassle and environmental impact. That summarizes the business concept for the ultrafast, compact, ultra-user friendly, energy-efficient, highly durable, practical, reliable and economical Falcon Series Ultrafast Gas Chromatograph.



# Column Module and Detector Module

With its patented modular columns and detectors platform, application range is second only to analytical speed in the list of Falcon Series GC advantages. Consider these diverse capabilities:

- Gas or liquid samples
- Fixed gases & hydrocarbons up to C<sub>50</sub>
- Petroleum products & biodiesel formulations up to C<sub>50</sub>
- FID, TCD, FPD or DBD (configured as helium ionization or electron capture)
- Single column module lengths up to 16 meters
- Dual column module units with 32 meters total length
- Dual detector configurations
- Dual column heartcut configurations



# Process Enclosure

The Falcon Series process enclosure is also modular and compact. The all-weather Falcon Series enclosure can even be tucked away "in the pipes" when needed. For most environments, the Falcon Series enclosure can be installed outdoors with only rain and sun protection, or in very economical 3-sided shelters. The enclosure module also includes an optional built in efficient air-conditioning system and has configurations for NEC, ATEX or IECEx hazardous area locations available with purge.



# Autosampler

The Falcon Series GC Autosamplers offer many outstanding features.

- Servo motor drive
- Simultaneous X-Y movement - not sequential
- Faster, quieter - more reliable movement
- Fast injections - software programmed control
- Simple operation methods linked to the Falcon Series GC
- Ultra-reliable and durable
- Direct syringe and heated headspace injections
- Headspace analysis
- Variable injection rates
- Variable syringe fill rates
- Multiple tray options



# Mobile System

The Falcon Series GC's compact size and superior performance makes mobile systems for GC analysis a functional reality.

- Upstream E&P evaluations
- Environmental emissions monitoring
- Roadside fuel marker detection
- Transportable product authentication
- Pipeline product interface detection
- Forensic analysis
- Fence-line monitoring

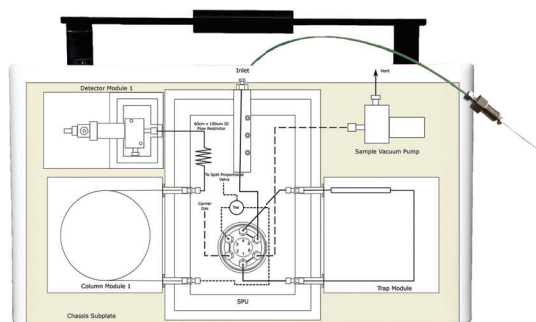
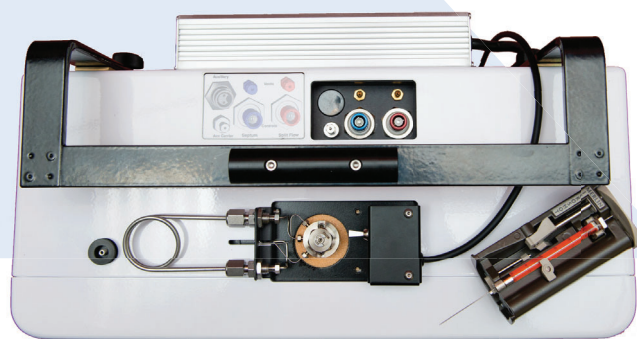


# Falcon Series Gas and Liquid Chromatographs

The Falcon Series Ultrafast Gas Chromatograph is a widely applicable, fast programmed temperature gas chromatograph consisting of:

- Injection methods include gas or liquid manual syringe injections, liquid or heated headspace autosampler injections and gas or liquid sample valve injections
- The sample can be drawn in through the inlet via a sample vacuum pump and is typically used in ambient air monitoring.
- One or two column modules can be run simultaneously either in a series or parallel to one or two detectors
- Teledyne's patented direct heating, precalibrated and individually programmed temperature column modules, enabling dual simultaneous analysis on the same sample, using different separation media and temperature profiles for maximum selectivity.
- Flame Ionization Detection, Thermal Conductivity Detection, Flame Photometric and Dielectric Barrier Discharge detectors are available.
- Maximum detector operating temperature is 662°F (350°C), application dependent
- Chromperfect® chromatography data system running on a Windows PC. Optional Infometrix® and Pirouette® software may be added to enhance data analysis and interface.
- System configurations enabling measurement of fixed gases up through components with boiling points equivalent to  $n - C_{50}$ . Samples can be gas or liquid phase and be directly injected into the split/splitless injection port. Optional SP/ME and other sampling methods are available.

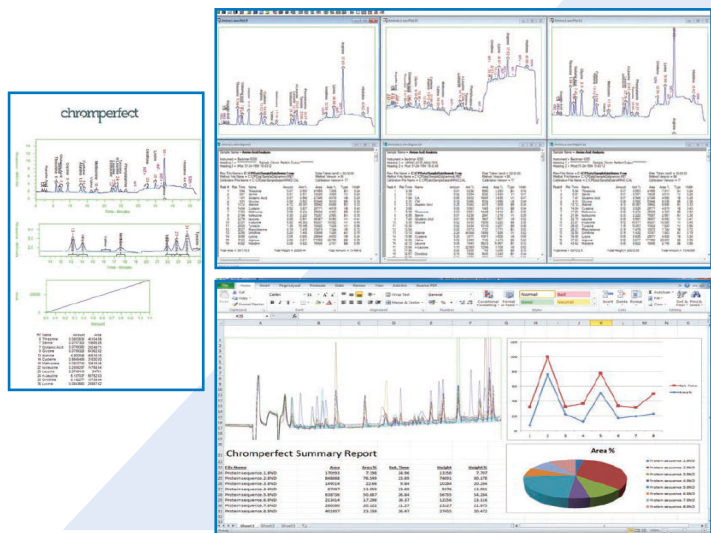
See the technical specifications for more information.



# Chromperfect® Seven™

## What is Chromperfect® Seven?

Chromperfect® Seven is a new PC based data system designed to meet the needs and budgets of smaller laboratories, offers much more than expensive competitive systems and shares the same core software as any other Chromperfect® system. It has a fully featured system with ease of use at the forefront of the product's innovative design.



## Features

- Easy to set-up, learn and use
- Flexible and powerful data acquisition
- Freedom to choose how many chromatograms are displayed and analyzed at a time
- Fully documented methods, sequences and reports, including instrument run logs
- Fully integrated System Manager which offers complete control over user privileges and system access

## Available Application Software

- **Natural Gas Reporter** - custom report program for characterizing natural gas and its condensates
- **Size Exclusion Chromatography** - Reporting and analysis tool for molecular weight distribution
- **Simulated Distillation** - Reporting package for petrochemical chemists to determine boiling point distribution of cruder oil
- **Analog Output Module**
- **Marker Trace** - Product authentication software for lab or mobile testing

## Optional Software

### Infometrix® LineUp™

LineUp™ software is an optional tool for adjusting retention times that does not require any prior information. Using a multivariate correlation method, LineUp™ will adjust a chromatogram's retention axis to more closely resemble that of a target chromatogram.

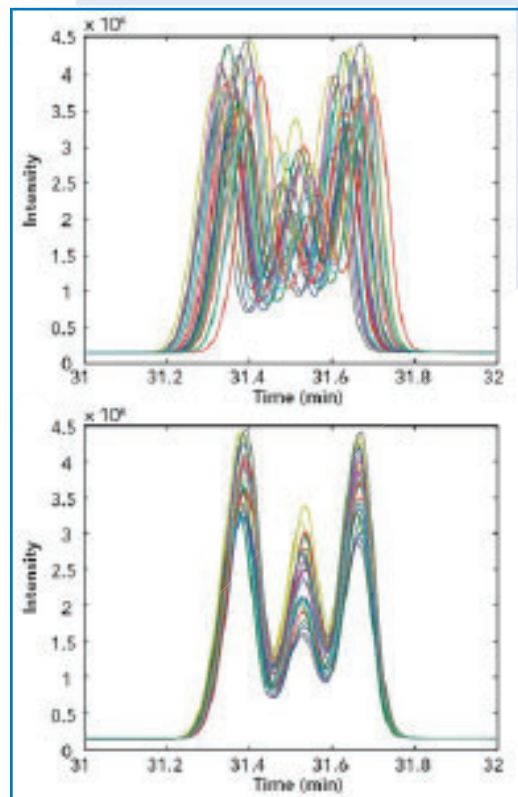
## Features

### Service Life

The service life of the columns and other components that may inadvertently impact retention time variance as they age can be extended. This adds significant replacement cost savings to the predictive maintenance value of LineUp™.

### Additional Features

LineUp™ can run manually, but is also designed to run invisibly. In addition, in the software bundle, manual adjustments to correct for retention time shifts are eliminated. The speed and efficiency of the measurement process are increased significantly as well as many process decision dependent on the GC measurement.



<b>Common Specifications</b>	
<b>Detectors</b>	Flame Ionization (FID), Thermal Conductivity (TCD), Flame Photometric (FPD), Dielectric Barrier Discharge (DBD) (configured as helium ionization or electron capture)
<b>Sampling Configurations</b>	Process online via sample valve for gas or liquid* Manual syringe injection for gas or liquid Autosampler injections for liquid or heated headspace Aspiration to inlet via sample pump  *Sample handling available
<b>Detector/Column Configurations</b>	101: Single column (2-16 meters), single detector 201: Dual column (4-32 meters), dual detector in series 301: Dual column (2-16 meters), dual detector in parallel CS: Dual column (2-16 meters), dual detector with column switching valve GS: Single column (2-32 meters) with large sample loop, single detector w/ sample pump GS-T: Single column (2-16 meters) with preconcentration trap, single detector w/ sample pump
<b>Repeatability</b>	Application Dependent
<b>Utilities</b>	Carrier Gas (application-dependent) UHP hydrogen and zero air (99.999% pure) (for FID and FPD only)
<b>Outputs***</b>	Analog Outputs: 4-20 mADC (isolated), 0-1 VDC, 0-5 VDC Digital Outputs: Relay contacts TCP/IP MODBUS Others available upon request  ***Via external PC modules

<b>Configuration-Specific Specifications</b>		
	<b>Falcon GC</b>	<b>Process Enclosure with PC</b>
<b>Temperature</b>	Operating: 32 to 95°F (0° to 35°C) Storage: -4 to 140°F (-20° to 60°C)	-40° to 122°F (-40° to 50°C) Configuration Dependent
<b>Power</b>	100-240 VAC 50/60 Hz with external converter 24 VDC power, 300 Watts max	100-240 VAC, 50/60 Hz Wattage as per configuration
<b>Data Management</b>	Front-panel touchscreen for GC initialization and manual sampling functions Communications and all other functions via TCP/IP Ethernet to external PC with Chromperfect® Seven software (Windows® 10 or higher OS required)**	Front-panel touchscreen for GC initialization and manual sampling functions Communications and Interface via front panel display with externally accessible fold-out keyboard / touchpad
<b>Dimensions</b>	17"W x 11" H x 8.5"W (43 x 22 x 28 cm) Approximately 25 lbs (11 kg)	36"W x 36"H x 21"D (97 x 91 x 53 cm) Configurable dependent Keyboard extends additional 15" (approx.)

\*\*Windows is a registered trademark of The Microsoft Corporation



# TELEDYNE ANALYTICAL INSTRUMENTS

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