

## Universal DIN Rail Process Control Module

For Signal Conditioning, Data Acquisition, PID Control and Alarms



Tracker 300 shown with optional T340 logic expansion module.

- ▶ Universal 20 bit Analogue Input
- ▶ Measures TC, RTD, 100mV, 10V, 20mA and Potentiometer Signals
- ▶ Fully Isolated to Eliminate Ground Loop Noise and Inaccuracy
- ▶ Comprehensive Process Alarm Functions
- ▶ Auto-Tune PID for Heat, Cool and Heat/Cool Applications
- ▶ RS485 Comms (Modbus Compatible) Fitted as Standard
- ▶ High Resolution (15bit) Analogue Output Option
- ▶ USB Powered Configuration using Free Windows Software
- ▶ Removable Terminals for Easy Installation
- ▶ Self Contained Unit for Single Loop Integrity
- ▶ Thermocouple Condition Monitor
- ▶ Heater Load Failure Detection
- ▶ Optional Logic Expansion Module (T340)
- ▶ 5 Year Warranty

### Description

The Tracker 300+ is a new generation of quality process instrumentation products in a compact DIN rail enclosure.

It is ideally suited for signal conditioning, alarm switching, data acquisition and PID control in any combination. Excitation power is available for 2-wire transmitters and strain gauge type sensors (T321 & T332 models). Power options are 24VDC/AC or a universal mains 110 / 230VAC.

Powered via the USB interface, the Tracker 300+ can be configured without making any other connections. The configuration settings can be uploaded and downloaded through the graphical interface of the free Windows Tracker Setup software.

Detachable terminals allow easy installation and an optional logic expansion module (Tracker 340) adds four relays with volt free change over contacts or TTL outputs, plus two logic inputs.

### Tracker 300+ can be easily integrated into your process control systems

#### Superb Signal Conditioning

The Tracker 300+ range offers full signal isolation to prevent noisy or inaccurate measurements. RS485 MODBUS communications are provided as standard and a high resolution isolated analogue output as an option. Thermocouple and RTD sensors are automatically linearised so the output is linear to temperature. User linearization features are also available for applications such as tank contents measurement.

#### Distributed Data Acquisition

The isolated two-wire RS485 communications interface supports runs of up to 1.2km and is compatible with HMI and Data Acquisition/SCADA software programs that support Modbus RTU protocols.

#### Flexible Alarms

The Tracker 300+ can be used as a trip amplifier by using the relay outputs in the Tracker 331 or the Tracker 340 logic expansion module. Delay timers and hysteresis functions stop nuisance alarms and alarm blocking is available for start-up conditions. An alarm can be latching or non-latching with the outputs energised or de-energised in the alarm condition.

#### Fully Featured PID Controller (T331 & T322)

The T330 series is ideally suited to applications including plastic extrusion, thermoforming, injection moulding, packaging and food processing. The T300 guarantees single loop integrity for multi-loop control applications and provides flexibility for plant condition monitoring. Auto-tune is used to calculate optimum PID values which are automatically put in the controller memory. Control outputs can be PWM Logic or analogue e.g. 4-20mA.

#### Thermocouple Condition Monitor

The Thermocouple Condition Monitor provides early warning of a possible failure so that a replacement can be planned alongside routine maintenance. This can save expensive interruptions to production.

#### Partial Load Failure Detection

This feature provides a warning of a partial electrical load failure (e.g. a heater element break). The feature also tests that no current is flowing when the switching device is set to off. Overload (high current) conditions can also be tested for and alarmed. The real time load current values and alarm conditions are also available via the serial interface.

## Tracker 300+ Series Specifications

### Maths Functions

18 Point user linearisation, Max / Min (Peak/Valley) memory  
Square root, S.G. Correction, Zero, Tare

### Alarm Functions

High, Low, Deviation (band), on delay time, off delay time, hysteresis,  
output selection (one alarm can switch more than one output)  
Outputs energised or de-energised in the alarm state

### PID Control (T331 & 332 Models only)

Type: PID with Auto-tune, PWM Logic or Analogue outputs  
Control Action: Reverse, Direct or Heat / Cool  
PWM Cycle Times: 0.1Sec to 30mins (Independent per output)  
Auto / Manual switching: Via logic input (T340) or Communications  
Load and Partial Electrical Load Failure Function (PWM outputs only)

### A/D Converter

Type: Sigma Delta, Resolution: 20 Bit plus Sign  
Drift with temperature: <100ppm/°C  
Update Rate: 15 / Second (7.5 / Sec for PV measurement)  
Common / Series mode rejection: >150dB / >70dB (50 & 60Hz)

### Thermocouple/RTD Measurement

Linearised Thermocouple Ranges:  
Type J, K, T, N, B, S, R, E, U, L, M(Ni/NiMo), G(W), D(W3) & C(W5)  
Linearised 3-Wire RTD Ranges: Pt100 (a=385), Pt100 (a=392), Pt130 & Ni100  
Typical accuracy: Base Metal ±0.5°C, Rare Metal ±1.2 °C,  
RTD 0.3°C. Engineering units: °C, °F or Kelvin  
RTD Excitation current 0.25mA (Nom)  
Thermocouple ageing feature and open circuit alarms

### DC Voltage, Current & Resistance Inputs

Ranges (Impedance): ±100mV(1000M),  
±10VDC(1M) and ±20mA(<5)  
Accuracy: 0.02% Typical

### Sensor Excitation Supply (Tracker 321 & 332)

Two Wire Loop Supply: 24VDC (Nom) @ 35mA max  
Bridge Supply: 10VDC Regulated @ 35mA max

### Logic Outputs (Tracker 322 & 331 only)

Relays Type: 1 x Normally open contacts. (Optionally 2 - No SSR)  
2 relays on the Tracker 322  
Rating: 1 Amp @ 240VAC, 5 Amp @ 30VDC  
SSR Drive output: 1 x 18VDC @ 20mA nominal

### Serial Communications Interface

Type: RS485, 2-wire multidrop  
Isolation: 500V DC/peak AC. Baud rate: Up to 155200  
Protocols: Modbus RTU, Modbus Floating point and DTPI (ASCII)

### Analogue Output (Option for all models)

Isolation: 500VDC / Peak AC  
Output: Selectable 0-10V, 0-20mA or 4-20mA, Scalable (including 20—4mA)



All Tracker 300 units have been tested and comply with the European Directives on Electromagnetic Compatibility and safety and each carries the CE marking. The enclosure is manufactured in recyclable and flame-retardant materials.

Manufactured by Data Track Technology plc, UK



Maximum Load (mA): 1000 Ohms  
Resolution: 15bit (1 part in 32768)

### Tracker 340 Logic Modules (Option for all models)

Relays Types (4): Volt Free Change over contacts (TTL options)  
Rating: 1 Amp @ 250VAC, 5 Amp @ 30VDC  
Logic Inputs (2): Volt free contacts or TTL

### Tracker 300+ Upgrade features

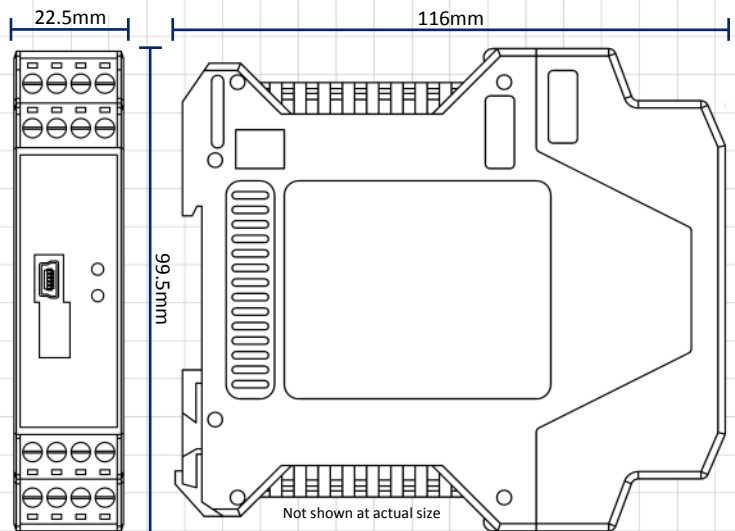
Fully compatible with previous Tracker 300 range  
Communications latency reduced by approx. 75%  
Automatic detection of the protocol used  
Configuration using Mini B USB.  
USB powers all the electronics required for configuration  
Removable/Plug-in terminals and terminal numbering

### Environmental

Temperature: 0-50°C Operating, -10 - 70°C Storage  
Humidity: 10-95% RH Non Condensing

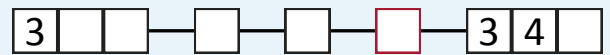
### Safety and EMC

Safety: EN61010, Susceptibility: EN61326-1:2006  
Emissions EN61326-1:2006  
CE certified 2009



Note: Depth 117.9mm when mounted on DIN Rail TS35 / TS35D

### Ordering Code



Model Number    Analogue Output    Power    2nd Relay T331 Only    Logic Module (if required)

Model:    321 Data Acquisition Module / Signal Conditioner  
          322 Dual Trip Amp  
          331 PID Controller  
          332 As 321 + PID Control (Requires T340 or analogue output option fitted for PID output)

Analogue:    A = Output Fitted, N = Not Fitted

Power:        1 = 90-230Vac 50/60 Hz (5VA)  
              2 = 24VDC / AC (5VA) nominal

2nd Relay    R = Fitted (Replaces SSR drive, 2 relays supplied)  
T331 only    N = Not fitted (1 x Relay + 1 x SSR drive supplied)

Logic Module:    341 = 4 x Relay (C/O) Outputs  
                    (All with 2    342 = 1 x TTL + 3 x Relay (C/O) Outputs  
                    logic inputs)    343 = 4 x TTL Outputs