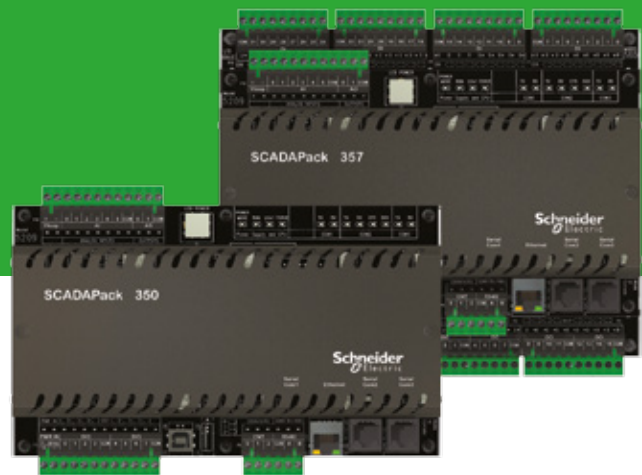# SCADAPack 350 | 357

Smart Remote Terminal Units

Built on the proven SCADAPack™ 300 controller platform that adheres to open standards and can operate in the harsh demands of a remote environment, the SCADAPack 350/357 Smart RTUs feature various communication links, a wide range of analog and digital I/O and a 12-30 Vdc supply.

The SCADAPack 350/357 Smart RTU helps to ease operations with:

- Simple ladder logic option (Telepace™ Studio)
- 28,192 permanent Modbus™ registers for use with logic and C++ applications
- USB host port for data logging to USB memory stick
- Up to 76 integrated digital/analog inputs/outputs, and more with I/O expansion modules
- Advanced power management
- Auxiliary supply for up to 7 analog loops
- Tool-less DIN rail mounting system
- IP2x terminal blocks
- Operation from –40 to +70°C (–40 to +158°F)
- Cost-effective, compact form factor

And provides powerful software tools and firmware features:

- Struxureware™ SCADA Expert ClearSCADA™ driver for Realflo™ remote configuration and data acquisition
- Optional open-standard IEC 61131-3 programming environment
- C/C++ programming support
- Open-standard industrial protocols Modbus RTU/TCP/UDP and DF1 master/slave, and open-standard telemetry protocol DNP3 level 2
- Store & forward mechanism between upstream and downstream SCADAPack 300 controllers
- Realflo flow computer for gas and liquids (including specific protocols used for Flow Measurement: Realflo Modbus and Enron Modbus)

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Smart Remote Terminal Units

Specifications – General characteristics

Controller

Processor	• 32-bit ARM7 microcontroller, 32 MHz clock, integrated watchdog timer. • Two microcontroller IO co-processors, 20 MHz clock
Memory	• 16 MB FLASH ROM, 4MB CMOS RAM, 4kB EEPROM • CMOS SRAM with lithium battery retains contents for 2 years with no power
Datalog Capacity	465,000 words
File system Typical storage	Internal : 6MB, external : up to 32GB on USB memory stick

Communications

Serial Port : COM1 Serial Port : COM2	• RS-485, 2-pole removable terminal block, 2-wire, half duplex, supports baud rates up to 115,200 bps • RS-232 port, 8-pin modular RJ45 jack, full or half duplex, or RS-485 port, 2-wire, half-duplex, supports baud rates up to 115,200 bps in RS-232 mode
Serial Port : COM3	RS-232 port, 8-pin modular RJ45 jack, full or half duplex with RTS/CTS control and operator interface power control, supports baud rates up to 115,200 bps.
Embedded Wireless	Specific controller versions embed a license-free radio module (different options: 900 Mhz, 2.4 Ghz) that uses one of the serial ports
Serial Protocols	Modbus slave/master, DF1 master/slave, DNP3 level 2 slave
Ethernet Port	8-pin modular RJ45 jack, 10/100 Mbps UTP (10/100Base-T), transformer-isolated
IP Protocols	• Modbus/TCP Server, Modbus/TCP Client, Modbus RTU in TCP Client , DNP3 level 2 in TCP Slave • FTP Server
Store & Forward	Stores & forwards frames between upstream and downstream SCADAPack 300 Smart RTUs
USB Device	USB 2.0 compliant "B"-type receptacle, for local configuration
USB Host	USB 2.0 compliant "A"-type receptacle, supports USB devices up to 32 GB (specific memory sticks supported)

General

Logic Control	SCADAPack Telepace Studio ladder logic or IEC 61131-3 SCADAPack Workbench programming suite (LD, ST, FBD & SFC)
I/O Terminations	SCADAPack 350: 6, 12-pole connector, 0.0810...3.31mm2 (28...12 AWG), solid or stranded SC-ADAPack 357: 5, 6, 7, 9, 10, 12-pole connectors, 0.0810...3.31mm2 (28...12 AWG), solid or stranded
Dimensions	SCADAPack 350: 211.8mm (8"34) wide, 140.4mm (5.53") high, 46.5mm (1.83") deep SCADAPack 357: 211.8mm (8"34) wide, 181.0mm (7.13") high, 66.0mm (2.60") deep
Enclosure	Corrosion resistant zinc-plated steel with black enamel paint
Environment	• Conformally coated • -40°C (-40°F) to 70°C (158°F) operating, -40°C (-40°F) to 85°C (185°F) storage • 5% RH to 95% RH, non-condensing
Shock & Vibration	IEC 60068-2-27 (tested up to 15g), IEC 60068-2-6
Warranty	3 years on parts and labor

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Smart Remote Terminal Units

Specifications – General characteristics

Power

Rated Voltage	12...30 Vdc. Limit voltage: 11.5...32 Vdc; turn on voltage: 10...11.5 Vdc; turn off voltage: 9...10 Vdc
Maximum Power	12 W at 24 Vdc (internal 5 Vdc supply fully loaded and Vloop on and boosted, fully loaded)

Power Requirements

SCADAPack 350/357 support 3 power modes: sleep, normal clock speed and reduced clock speed
• SCADAPack 350 typical power consumption (at 20°C/ 68°F):

SCADAPack 350				At normal clock speed		At reduced clock speed	
	Ethernet	Controller LEDs	Vloop fully loaded	12 Vdc	24 Vdc	12 Vdc	24Vdc
Sleep mode				15mW	27mW	15mW	27mW
Use case 1	OFF			0.7 W	0.6 W	0.5 W	0.4 W
Use case 2	ON	OFF	OFF	1.6 W	1.5 W	1.4 W	1.3 W
Use case 3	OFF	OFF	ON	4.3 W	4.1 W	4.1 W	3.9 W
Use case 4	ON			5.2 W	5.0 W	5.0 W	4.8 W

• SCADAPack 357 typical power consumption: from 15mW at 12 Vdc in sleep mode to 8.9 W (with up to 7 analog input/output loops powered from Vloop supply)

Power outputs	Vloop • Maximum 140mA at 12 V (booster turned off) or 24 Vdc (booster turned on); can power up to 7 analog input/output loops

Certifications

EMC and Radio Frequency	• ICES-003 Issue 5 August 2012 • CE and RCM markings
General Safety	UL 508
Hazardous Locations	• cCSAus Non-incendive Electrical Equipment for use in Class I, Division 2, Groups A, B, C and D • IECEx/ATEX Class I, Zone 2 (does not include embedded Wireless versions)

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Specifications – Digital and Analog Inputs/Outputs

Controller board (350 and 357)

Analog Inputs	5, user selectable 0...10V or 0...20mA plus over range 1, 0...32.7 Vdc (15-bit) for DC supply monitoring • Resolution: 15-bit ADC (15-bit over the measurement range in 10V, 14-bit in 20mA) • Accuracy: ±0.1% of full scale at 25°C (77°F), ±0.2% over temperature range • Input Resistance: 250 Ω or 20 kΩ in 20mA or 10V configurations (60 kΩ for 32.768V) • Normal rejection mode: 27 dB at 60 Hz
Analog Outputs	2 (optional), 0...20 mA, 4...20 mA, voltage output may be accomplished with external precision resistor • Resolution: 12-bit over 0...20 mA range • Accuracy: ±0.15% at 25°C (77°F), ±0.35% of full scale over temperature range • Response Time: less than 10 μs for 10% to 90% signal change • Power Supply: 12…30 Vdc, external • Power (Current) Requirements: 10 mA plus up to 20 mA per output • Isolation: isolated from RTU logic and chassis • Load Range: 12 Vdc: 0…375Ω, 24 Vdc: 0…925Ω, • Logic End-Of- Scan to Signal Update Latency: typically 18... 27ms
Digital Inputs/Outputs	8, user-selectable as inputs or outputs (open drain) **As Digital Inputs** • Dry contact **As Digital Outputs** • Sinking MOSFET output, rated 30V, 0.5A, ground return connected to Chassis Ground
Counter Inputs	• 1, 0...10Hz (dry contact) • 2, 0...10kHz (turbine or dry contact)
Internal Power monitor	Power input - analog input and low indication, onboard lithium battery - low indication
Internal Temperature Monitor	Controller temperature range –40°C…+75°C (-40°F...+167°F)

I/O board (357 only)

Analog Inputs	8, software-configurable to 0...20, 4...20mA , 0...5 or 0...10V Same features as for the 5 analog inputs located on the controller board (see above) except the following: • Isolation: 500 Vac from logic and chassis
Analog Outputs	2 (optional), 0...20/4...20mA, voltage output may be accomplished with external precision resistor Same features as for the analog outputs located on the controller board
Digital Inputs	32, 12…24 Vdc • Turn on voltage: 9 Vdc (minimum), Turn off voltage: 4 Vdc (maximum) • Over-voltage tolerance: 150% sustained over-voltage without foreseeable damage • DC input current: 0.67 mA at 24 Vdc • Time stamping : 170ms • Isolation : in group of 8, 1500 Vac from logic supply and chassis
Digital Outputs	16, relays (Form A) • 4 contacts share one common • Isolation : isolated in groups of 4. Isolated from RTU logic, RTU chassis and other groups to 1500 Vac • Maximum Switching Voltage: 30 Vdc or 250 Vac (resistive) • Maximum Switching Load: 150 W or 1250 VA (5 A)

Additional I/O

I/O Expansion	Supported modules : • Current 5000 modules (except 5608 and 5610 models) Maximum number of modules per unit: • SCADAPack 350: 8 (*) • SCADAPack 357: 7 (*) (*): to reach this limit, additional power supply modules (reference: 5103) are required

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Smart Remote Terminal Units

Model Code

	SCADAPack 350/357
Model	**Select : Controller**
TBUP350	SCADAPack350, Controller 32 bits, 5 Analog Inputs, 8 Digital I/O, 3 High Speed Counter Inputs
TBUP357	SCADAPack357, Controller 32 bits, comes with the above plus additional I/Os

Code	Select : Future Option
1	None

Code	Select : Gas & Liquids Flow Run-Time Option
A	None
	Gas Only Flow Computer Options
G	2 Run Gas Flow
F	4 Run Gas Flow
V	2 Run Gas Flow - Gas Transmission Version (Requires RealFLO 6.72+)
W	4 Run Gas Flow - Gas Transmission Version (Requires RealFLO 6.72+)
X	Gas Flow Controller with 3 Pemex Gas Transmission flow runs (requires Reaflo 6.82+)
	Gas & Liquids Flow Computer Options
L	Gas & Liq 1: Supports 1 Gas run, 1 Liquid run, and 1 Water run
M	Gas & Liq. 2: Supports 2 Gas runs, 2 Liquid runs, and 2 Water runs
N	Gas & Liq. 3: Supports 3 Gas runs, 3 Liquid runs, and 3 Water runs
P	Liq. 4: Supports 4 Liquid runs and 4 Water runs

Code	Select : Protocol Option
2	Modbus and DNP3 level 2 protocol emulation

Code	Select : Programming Environment
0	Telepace Ladder logic and C language firmware loaded – IEC 61131-3 enabled (Programming tools sold separately)
1	IEC 61131-3 and C language firmware loaded – Telepace enabled (Programming tools sold separately)

Code	Select : Analog Inputs
A	P350 : 5 selectable as 0...10V or 0...20mA *P357 : adds 8 selectable as 0...20mA, 4...20mA, 0...5V or 0...10V

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Model Code

SCADAPack 350/357

Code	Select : Digital Inputs/Outputs
A	P350: 8 Digital I/O, individually selectable as digital input (Dry Contact) or digital output (Open Drain)
B	P357: adds 32 digital inputs (12-24V), 16 digital outputs (Dry Contact relay for Class I Div 2, Solid State relay for IECEx/ATEX)

Code	Select : Analog Outputs
0	None
1	2 channel Analog Output, 0..20 mA, external DC supply
2	P357 only : 4 channel Analog Output, 0..20 mA, external DC supply

Code	Select : Integrated Communications Interfaces
0	None
	FreeWave™ & MDS™ Radios (requires one RS232 port)
1	900Mhz FreeWave Spread Spectrum Radio
A	900MHz MDS Spread Spectrum Radio
	Trio™ Radios - 900MHz (requires one RS232 port)
B	900MHz Trio Spread Spectrum Radio with encryption, 902-928MHz (FCC / IC)
C	900MHz Trio Spread Spectrum Radio with encryption, 915-928MHz (AUS)
D	900MHz Trio Spread Spectrum Radio, 915-928MHz (BRAZIL)
E	900MHz Trio Spread Spectrum Radio, 921-928MHz (NZ)
	Trio Radios - 2.4GHz (requires one RS232 port)
J	2.4GHz Trio Spread Spectrum Radio, ETSI/100mW, ATEX (EUROPE)
K	2.4GHz Trio Spread Spectrum Radio with Encryption, 500mW (CANADA, USA & AUSTRALIA)
L	2.4GHz Trio Spread Spectrum Radio, 500mW (OUTSIDE OF EUROPE, CANADA, USA & AUSTRALIA)

Code	Selection : Certifications
S	With FCC, UL508, CE marking and RCM
X	Adds IECEx/ATEX Class I, Zone 2
U	Adds cCSAus Nonincendive Electrical Equipment for use in Class I, Division 2, Groups A, B, C and D

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Smart Remote Terminal Units

Disclaimer: Not all product features are available in every mode of operation.
Schneider Electric reserves the right to change product specifications. For more information visit www.schneider-electric.com.

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