RUG3

Ultra Low-Power RTU

RUGID

Ultra

Low

Power

For

Ultimate

Flexibility

The RUG3 RTU is the latest in a long line of RUGID RTUs designed for remote data acquisition and control applicaitons. The most compact of the RUGID RTUs, this unit draws as little as 2 mA in full operation making it ideal for projects where power resources are limited.

I/O	Communication Ports	Operator Interface*	Enclosure Options	Programming	Power
6 Analog Inputs (0-5V or 4-20mA)	1 RS232/USB and 1 RS232/RS485*	2 x 16 character backlit	DIN rail mount w/ display	FREE software	As little as 2mA
8 Digital Inputs	Modem*	Sealed tactile keyboard	DIN rail mount w/o display	Over 145 pre-programmed modules	5 - 15 VDC
4 Digital Outputs			Panel mount w/ display	Ladder logic	
2 Analog Outputs*			No enclosure (bare board)	Field upgradable OS	
24V loop supply			OEM		
5V reference supply					

Operator Interface

The built-in operator interface uses familiar prompts and user-defined displays, eliminating operator guesswork and code memorization. The 2x16 character backlit display can scroll through several screens of information with a single keypress.

The sealed tactile keyboard enables setpoint changing.
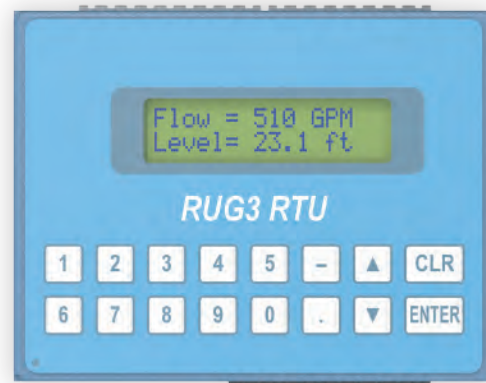
Low Power Consumption

The RUG3 draws as little as 2 milliamps in full operation. This includes the display on, running at full speed with the modem working.

RUG3 Top View

RUG3 CPU

The RUG3 CPU is fully integrated with 2KB of battery-backed RAM, 60KB of program FLASH and 2MB of EEPROM for logging memory. The RUG3 is configured using pre-programmed modules and ladder logic. The operating system may be field upgraded and is a FREE online download.

Built-In I/O

The RUG3 comes standard with a wide variety of I/O. Standard are six analog inputs, eight digital inputs, four digital outputs, and two RS232 ports. The RUG3 also comes standard with a 24V loop supply and a 5V reference supply. Available options include onboard modem with debugging headphone jack, two analog outputs and RS485.
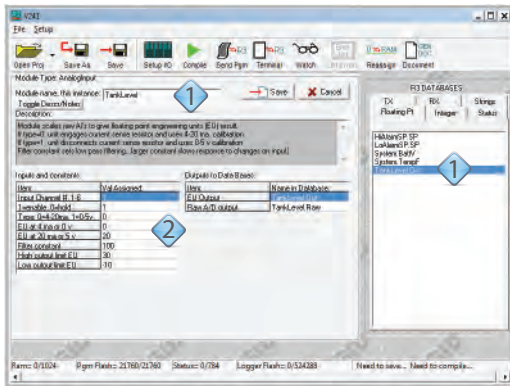
RUG3 Bottom View

*Optional

Programming

The RUG3 is programmed using the FREE support software package which includes a built-in library of over 145 pre-compiled modules. The best part is that no formal programming experience or knowledge is required. All the programmer must do is fill in the blanks to configure the RTU.
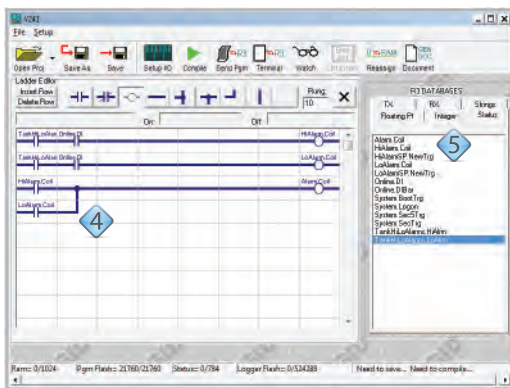

1 The module name given becomes the signal name in the database.
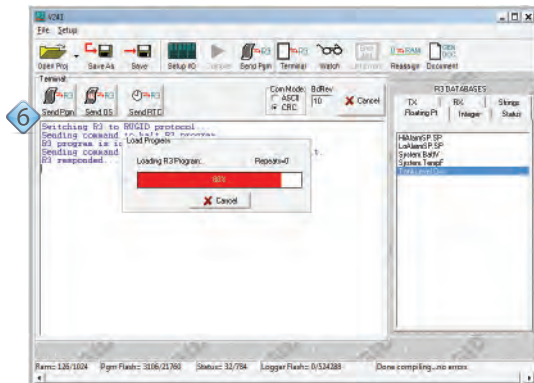
2 Setup I/O properties.
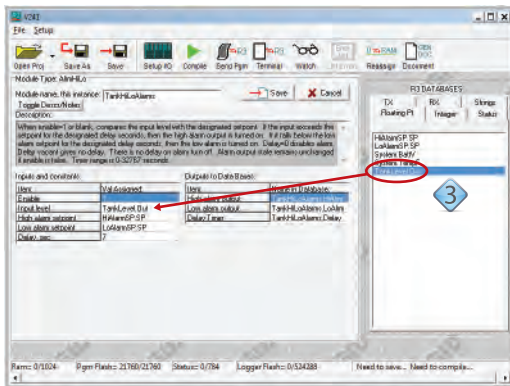
3 Design control strategy; drag inputs from databases into module fields or type in values.

4 RTU control logic may also be implemented using ladder logic.

5 Ladder coil becomes database status signal and me be used within ladder logic or modules.

6 Compile and send program to RUG3.

WATER SYSTEM TELEMETRY

Tank sites
Filter plants
Booster stations
Pump controls
Lake and stream monitoring

WEATHER MONITORING

Flash flood warning
Snowpack monitoring
Reservoir levels
Stream flows
ALERT or 2-way
Cloud seeding

WASTEWATER SYSTEM TELEMETRY

Lift stations
Treatment plants
Pump controls
Effluent monitoring
Chemical feeds

SHIP MONITORING

Mothball fleet
Intrusion alarms
Flood alarms
Fire alarms
Cathodic detection

PETROLEUM SYSTEMS

Wellhead safety
Tank farms
Gas flow
Fuel level/flow
Spill detection

IRRIGATION SYSTEMS

Remote pump control
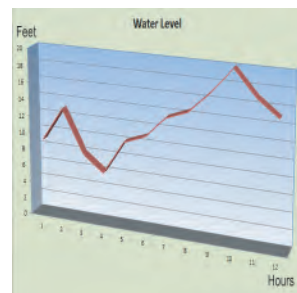Alarm monitoring
Pivot control

CANALS

Flow rates
Gate position
Valve control

DATA LOGGING

2M Bytes
Non-volatile flash memory
Stores a mix of time tags, statuses, integers, and floating point

INDUSTRIAL

Process monitoring
Gas leak detection
Test monitoring
Alarm monitoring
Process control

DAM SAFETY

Flood warning
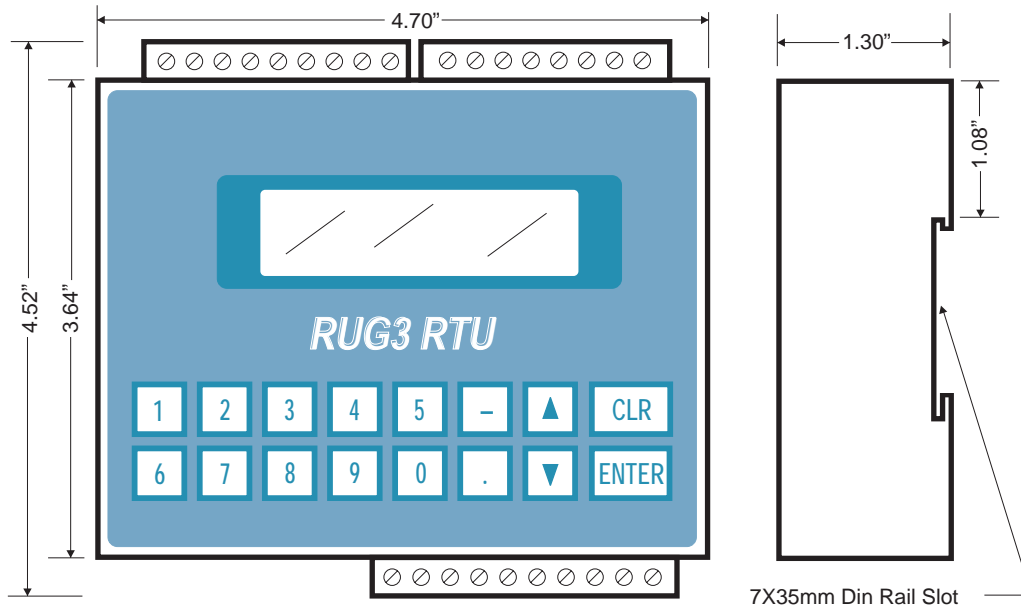Dam integrity
Inflow/outflow monitoring
Gate position

Specifications

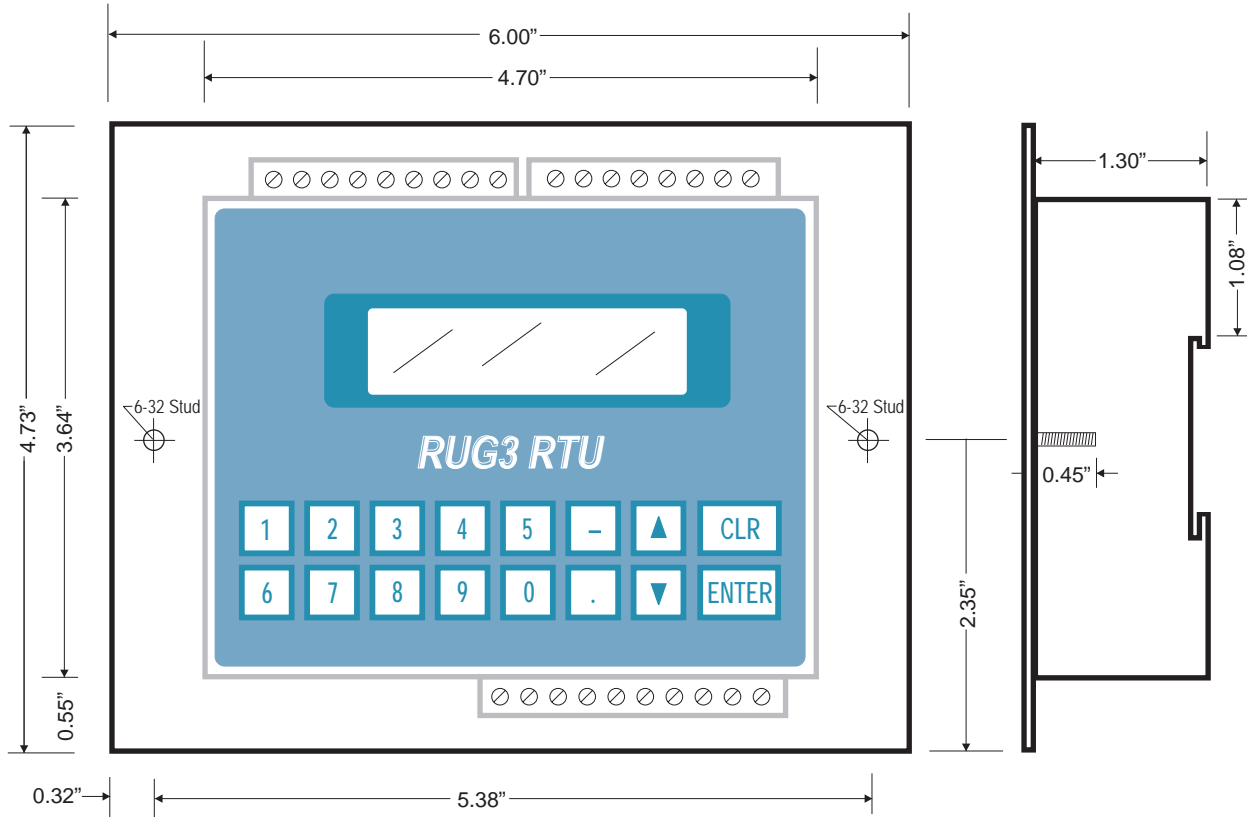•Logic Family: All low power CMOS

•Microprocessor: 16-bit MSP430, 8 MHz, 16-bit data bus, 16-bit address bus

•Memory:

    -RAM – 2 Kbytes battery backed low power static RAM

    -Program FLASH – 60 Kbytes

    -Logging FLASH – 2 Mbytes

    -Battery Backup – Lithium coin cell backs up RAM & real-time clock/calendar, min. 2 years

•Display: 2 line X 16 char backlit LCD, sunlight readable, backlight switchable by software

•Keyboard: 16 key sealed tactile membrane with interrupt scanning

•Real-time clock/calendar: Battery backed clock/calendar

•Operation Security:

    -Watchdog Timer – Hardware timer resets unit 0.5 seconds after interrupt fail. Cannot be disabled

    -Telemetry Watchdog – Resets rcv buffer if no character received within 1 second

    -Brownout Detector – Halts process if logic voltage falls below 2.7 V, restarts when voltage rises to 3 V

•Autobooting: Auto startup on power application

•I/O Surge Protection: All I/O is equipped with circuitry to protect from surges

•Analog Inputs: 6 channels, 12 bit res., successive approx, 4 – 20 mA or 0 – 5 V, (software selectable) factory calibrated

•Analog Outputs: 2 channels optional, 4 – 20 mA, 12 bit res. Optically isolated, factory calibrated

•Digital Inputs:

    -Status – 8 channels, dry contact compatible, self-powered

    -Pulse Counting – DI pairs can count >1200 pps

    -Pulse Duration Detecting – All DI can convert pulses to analog with 4ms resolution

    -Shaft Encoder – DI's in pairs used to decode shaft encoders

•Digital Outputs:

    -4 channels, 3-amp mechanical relays (3A @ 277VAC/30VDC; 3A @ 125VAC) OR 0.5 amp solid-state relays

    -Pulse Duration Outputs

•Anemometer Input: AI6 connected to clipping amp, counted to derive wind speed

•Reference Output: 5 VDC, 50mA reference standard, shares pin with DI8

•Loop Supply/Instrument Power: 24V loop supply switchable to unregulated supply voltage and can be switched on/off by software. Diode isolated

•Serial Ports: 2 serial ports – One programming/general purpose port, one general purpose port, upto 38,400 baud

•Modem:

    -Bell 103 standard / ALERT standard

    -4-wire audio, adj. gain, transformer isolated, optically isolated key line. Low tones mode for splinter chan.

    -Transmit Power – 0 – 4 Vp-p, software adjustable in 32 steps

•Power Interface:

    -12 VDC +/- 20%, diode isolated, 2 mA normal operation (relays, loop supply and backlight off) to 440 mA max.

    -USB (loop supply off)

•I/O Connections: All I/O uses removable rising cage screw headers in banks of up to 10 each, 14 ga wire. RS232 and Modem ports use 3.5 mm cylindrical jacks

•Communications (all standard):

    -Modbus TCP Master (requires external serial to ethernet)

    -Modbus TCP Slave (requires external serial to ethernet)

    -Modbus TCP Slave Mode2 (requires external serial to ethernet)

    -Modbus Master

    -Modbus Slave

    -Modbus Slave Mode2

    -ASCII

    -R9 Protocol – Background CRC gen/decode, variable length messages, user defined message lengths. Can combine status, int, float, in any message

    -R6 Protocol – Used to communicate with older RUG6's, RUG7's, and RUG8's

    -Eavesdrop Mode – R9 protocol, any RTU can accept data passing between any other stations

    -Peer to Peer – Full RTU to RTU or RTU to master or master to RTU messaging

    -Store and Forward – Initiating station sets path through up to 3 intermediary stations

    -Address Range – 1 to 65,000 (1 – 254 when using store and forward)

    -Report-by-exception

•Software:

    -Storage – Operating system and all user configuration and program ming stored in non-volatile flash memory. Flash loader stored in flash protected boot block

    -Security – Parameter voting and memory integrity test on boot up, CRC gen/detect on serial ports. Program loading CRC protected

    -Scanning – Built in software scans all I/O, ports, timers, and realtime clock

•Programming: Applications use precompiled modules resident in flash memory where programmer interconnects modules and sets properties using the FREE Windows 95/98/NT/XP/Vista/Win7 compatible Rugid support software.

•Ladder Logic: Ladder logic built in to configuration program to handle misc. controls

•Data Logging: Logs floating point, integer and status samples with time tags to onboard flash EEPROM. Log up to 2MB of samples and time tags. Can dump logs to serial port as delimited ASCII

•Variables: Supports 16 bit integer, 32 bit floating point, boolean, and strings

•Error Messages: Configuration program handles all setup errors. Runtime software is self protecting; no runtime errors

•Enclosure: 16 gauge steel, blue powder coat DIN rail mountable with display/keyboard (optional)

    -Case: 4.7 X 3.6 X 1.3 in.

    -Panel mount flange: 6.0 X 4.7 in.

    -Board: 4.5 x 3.5 x 0.85 in.

•Environmental: -40 to +85 degrees Celsius (logic), -20 to +70 degrees Celsius (LCD display) 0-85% non-condensing

•Documentation: Full 230 page technical manual available at www.rugidcomputer.com

•Warranty: 1 year standard limited warranty

•Repair: Nominal 24 hour turnaround

RUG3 DIN Rail Mount

4.70"

4.52"

3.64"

RUG3 RTU

| 1 | 2 | 3 | 4 | 5 | – | ▲ | CLR |
| 6 | 7 | 8 | 9 | 0 | . | ▼ | ENTER |

1.30"

1.08"

7X35mm Din Rail Slot

RUG3 Panel Mount

6.00"

4.70"

4.73"

3.64"

6-32 Stud

RUG3 RTU

6-32 Stud

| 1 | 2 | 3 | 4 | 5 | – | ▲ | CLR |
| 6 | 7 | 8 | 9 | 0 | . | ▼ | ENTER |

0.55"

0.32"

5.38"

1.30"

1.08"

0.45"

2.35"

www.rugidcomputer.com

Made in USA

RUGID COMPUTER, INC.

9730 Lathrop Industrial Dr. SW, F1 • Olympia, WA 98512, USA

P: 360-866-4492 • F: 360-866-8074

www.rugidcomputer.com

RUGID

WHEN YOU MUST STAY IN CONTROL