



Weatherford®

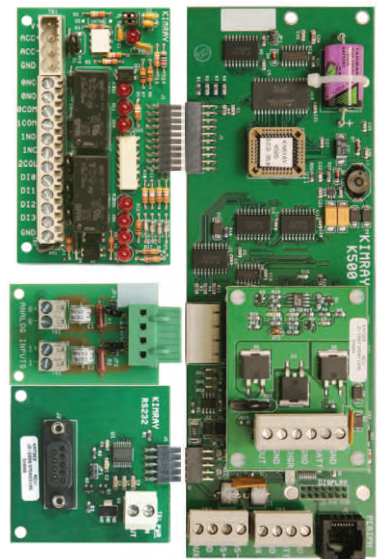
Plunger Lift

CEO™ K-500 Remote Terminal Unit For Plunger Lift Applications

The CEO K-500 remote terminal unit (RTU) provides multiple-well flow measurement and control, functioning as a master for remote input/output modules to perform wireless plunger lift, well monitoring, and well control. This complete standalone or remote-control package, with integrated telemetry, is capable of gas/liquid flow measurement, process control, alarming, and data logging and storage. The K-500 RTU allows for configurations ranging from custody-transfer quality electronic flow measurement (EFM) to full well monitoring and production control as well as a fully functional SCADA remote. This highly flexible system is also very dependable in harsh environments.

Applications

- Multiple-meter flow measurement (orifice or V-Cone® measurement)
- Multiple-well measurement and control of gas flow, liquid flow, casing and tubing pressure, control valve, tank level switch, equipment run status, and run time
- Plunger lift wells (flow, casing and tubing pressure, plunger arrival sensor, control valve, bypass B valve)
- Plunger lift control (well condition-based control with complete data logging with production events and analog trending)
- Compressor site monitoring and control (gas flow, pressure monitoring, run status, run time totalization, local and remote control)
- Water injection well-site measurement and control (turbine flowmeter, casing and tubing pressure, choke valve control, pressure and/or flow-based control, data logging)



V-Cone is a trademark of McCrometer, Inc.

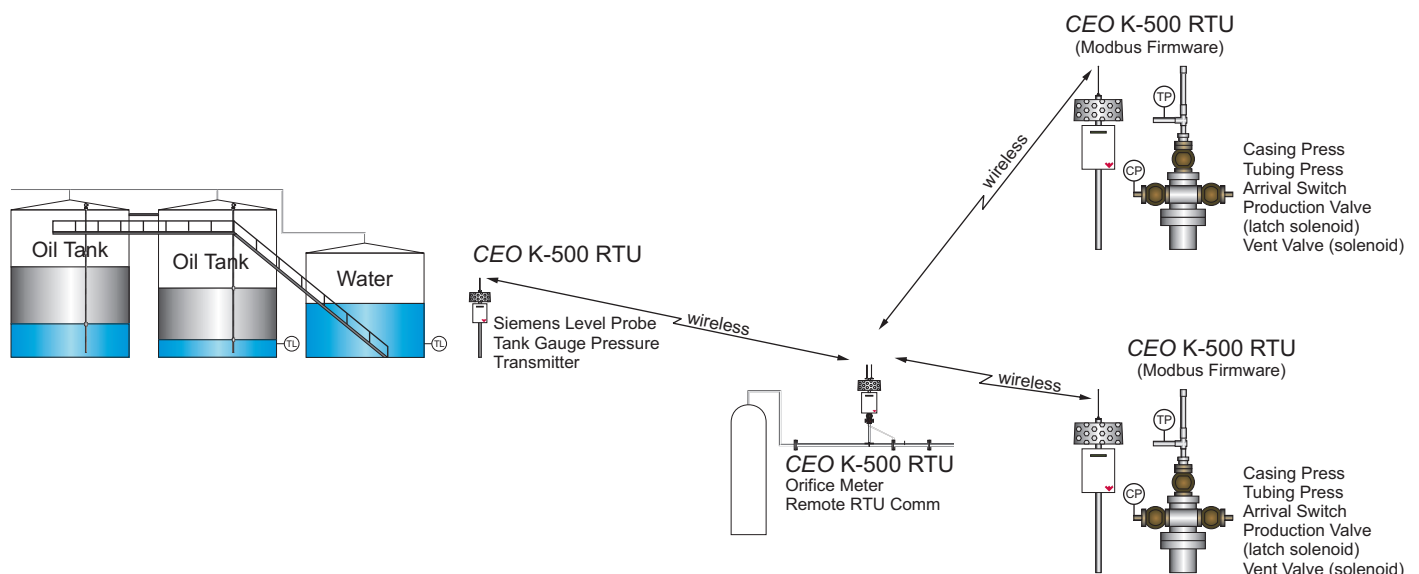
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Features, Advantages and Benefits

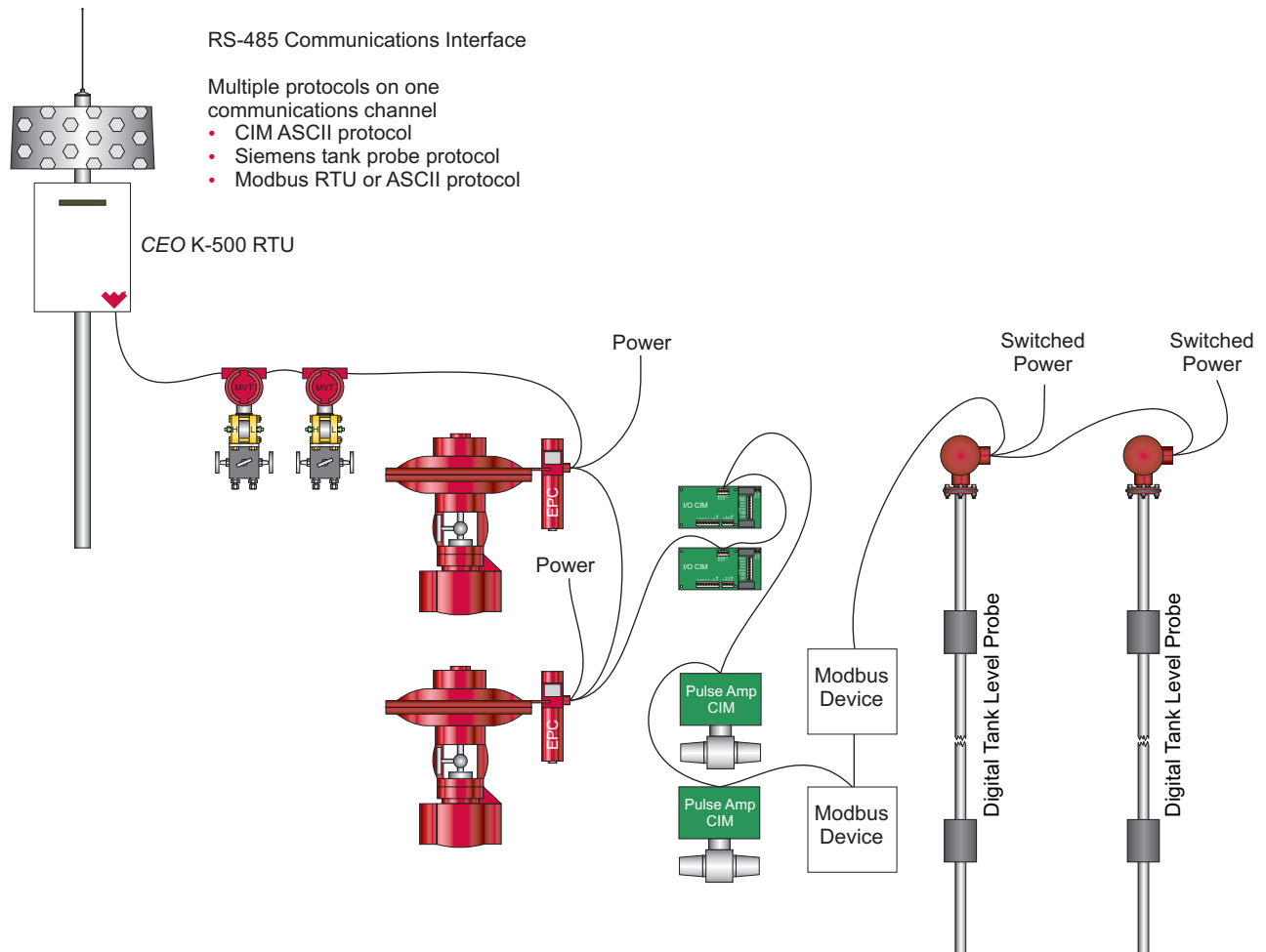
- PROControl™ (production control) package enables the operator to use powerful, field-proven algorithms for full production control and optimization. In harmony with this package, the K-500 RTU records well performance parameter data, giving the operator insight into well operating characteristics never before available.
- The K-500 RTU records meter calibration results, flow computer events, and flow parameter changes in a time-and data-stamped event log and also provides 35 days of hourly and daily flow computer data. The event log and data storage combine to provide a complete custody-transfer quality audit trail. Configurable trending of analog values is provided in addition to the flow computer data storage.
- The K-500 RTU is easily configured on site, using free terminal emulation software and IMI software, or configured remotely through a host system.
- Current and historical data, trend data, and production events can be viewed and analyzed remotely or on site using a laptop, palmtop, or personal digital assistant (PDA). Pluggable power control board has a built-in solar battery charging regulator for solar applications. CMOS ultra-low power design enhances solar applications by minimizing panel and battery requirements.



PROControl is a trademark of Kimray, Inc.



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Specifications

Standard Equipment

RTU Board	
Board options	Analog input board Digital I/O board Communications board
Enclosure System	
Aluminum NEMA 4 enclosure with display cutout	16 × 12 × 10 in. 40.6 × 30.5 × 25.4 cm
Steel NEMA 4 enclosure with display cutout	16 × 14 × 6 in. 40.6 × 35.6 × 15.2 cm
Pole mounting flanges	2 in. 5.1 cm
Power Requirements	
Voltage	11.5 to 16.0 VDC
Ultra-low power	<1/4 W (16 ma at 13.6 DC)
Built-in battery voltage measurement	Internal analog input
Memory	
Flash firmware memory	512 KB
Standard RAM*	512 KB
Environmental	
Temperature tolerance	-40° to 158°F -40° to 70°C
Relative humidity tolerance, non-condensing	0 to 95%
Communications	
1 RS-232 user interface port (LOS)	
1 RS-485 device interface port (simultaneous protocols), 9600 baud, 8 data bits, no parity, 1 stop bit	CIM protocol Siemens digital level probe protocol Modbus RTU master protocol
1 connector for pluggable communications port options	RS-232 board Spread spectrum radio board RS-485 board
Scheduled power control of communications device	
Standard communications protocol	Kimray native
Optional communications protocols	Enron Modbus DNP3
RTU System Options	
LCD 2-line display	
Battery charging regulator	Built-in or external mounting 5-amp DC maximum charging current
Built-in multivariable flow transmitter (MVT)	
User interface jack (LOS jack)	

*Lithium-battery backed-up RAM



CEO™ K-500 Remote Terminal Unit For Plunger Lift Applications

Specifications

Digital Input/Output Board

Inputs	
4 discrete inputs (contact closure)	
Optical isolation	1500 VDC
Isolation resistance	100M ohm
Transient protection	IEEE 472-1974
Terminals	Compression type
LED indicator for each input	
Outputs	
2 SPDT relays	
Rating at 277 VAC, 30 VDC	10 amp
Isolation	1500 VAC
1 open collector	1-amp rating
Terminals	Compression type
LED indicator for each output	
Accumulator Input	
1 high-speed pulse input	
Jumper-selectable filtering	30 Hz, 1000 Hz, or none
Optical isolation	1500 VDC
Isolation resistance	≥100M ohm
Transient protection	IEEE 472-1974
Plug-in terminals*	Compression type
Maximum pulse rate	25 KHz
LED indicator	

*Plug-in will accept optional pulse amplifier board



CEO™ K-500 Remote Terminal Unit

For Plunger Lift Applications

Specifications

Analog Input Board

Two single-ended inputs	
Resolution	12 bit
Accuracy	±0.05% of full-scale accuracy, +1/2 lsb at 77°F (25°C)
Temperature compensation	13.89 ppm/°F (25 ppm/°C)
Input signal options	1 to 5 V or 4 to 20 mA DC input range, jumper selectable
Calibration	Software-based 3-point curve-fit calibration for each input
Terminals	Compression type

Optional Accessories

- Pluggable-turbine meter interface card
- External-turbine meter amplifier interface card
- External-turbine meter amplifier CIM* interface card
- RS-232 port sharing board
- Input/output CIM board

*CIM = Communications interface module



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Optional Accessories

Orifice or V-Cone® Measurement

Multi-Variable Flow Transmitter (MVT)	High-Accuracy Model	Standard-Accuracy Model
Reference accuracy for differential and static pressure (DP and SP)	±0.075% of calibrated span	±0.25% of calibrated span
Differential Pressure Measurement (DP)		
Range	0 to 400 in. H ₂ O (0 to 10,160 mm H ₂ O), (250 mbar)	
Static Pressure Measurement (SP)		
SP available ranges	0 to 750 psia (0 to 5.171 MPa), absolute	0 to 1,500 psia (0 to 10.342 MPa), absolute
	0 to 1,500 psia (0 to 10.342 MPa), absolute	
	0 to 4,500 psig (0 to 31.026 MPa), gauge	
Temperature Measurement (FT)		
Range	-50 to 250°F -46 to 121°C	
Accuracy	±1.0°F (±2.12°C)	
Sensor type	RTD, 100-ohm platinum (385), 4-wire	
Physical Specifications		
Overpressure limit	3,000 psig (20.68 MPa) for MVT ranges 750 and 1,500 psia (5.171 and 10.342 MPa)	
	4,500 psig (31.03 MPa) for MVT range 4,500 psig (31.03 MPa)	
Hookup and Mounting		
Process barrier diaphragm	316L stainless steel	
Process connections	1/4-in. NPT female standard flange connection	
Process head material	Zinc-plated carbon steel OR 316 stainless steel	
Communications		
Interface	RS-485 (2-wire data, 2-wire power)	
Format	9,600 baud, 8 data bits, no parity, 1 stop bit	
Protocol	Kimray CIM ASCII Protocol	

Note: Refer to the MVT technical specification sheet for additional details.



Intregal MVT



External MVT