ProVU 4 Advanced Temperature & Process Controller



- **1/4 DIN Format**
- **Graphical / text LCD Display (red/green)**
- **Profiling option**
- **Datalogging option (data, alarms & events)**
- **5 language (English, French, German, Italian, Spanish)**
- **Configurable user-menu structure**
- **Modbus RS485 and Modbus TCP Ethernet supported**
- **USB option**
- **Standards CE, UL and cUL**

ProVU with graphic/text LCD display is an affordable temperature and process controller with advanced functionality including profiling and datalogging options. Designed to improve user efficiency many features are integrated to reduce commissioning time, simplify operation and minimise maintenance downtime.

Specification

Features

HMI Display	Graphic display, easy to read backlit LCD display, dual colour screen (green / red), multi-language option, custom splash-screen on startup *(bitmap file),* alarm status view, on screen trend view, LEDs to indicate heat, cool, autotuning and alarm
User operation and control	Easy setup wizard for quick configuration, *(inputs, alarms, outputs, comms & real-time clock),* universal input for thermocouple, RTDs and linear DC process signals *(mA, mV or V)*, Flexible output options, relay, ssd driver, triac & Linear DC (9 max). Select to precisely match the process, digital input (2 max) for setpoint selection, profile control, datalogging start/stop, control output enable/disable or auto/manual control, Configurable menus (via BlueControl software), USB port for local upload/download of configuration files & download logged data, password protected supervisor and configuration mode, pre-tune and self-tune function, master-slave configuration for multi-zone applications
Profiling function (option)	255 segments to allocate freely in up to 64 programs, ramp, dwell, hold, loop or jump to other profile, user defined text profile name, delayed or real-time day/time profile start, up to 5 event outputs.
Datalogging Function (option)	Historic process data for analysis or reporting, export data files via front USB or comms, log process values, setpoints or alarms (including min, max & ave), run-then-stop or FIFO (first in – first out) buffer recording, logging intervals from 1s to 30m

Process Input

Sampling Rate:	10 per second.
Resolution:	16 bits. Always four times better than display resolution.
Impedance:	>10MΩ resistive, except DC mA (5Ω) and V (47kΩ).
Temperature stability:	Error <0.01% of span per °C change in ambient temperature.
Supply Variation	Supply voltage influence negligible within supply limits.
Humidity Influence:	Negligible if non-condensing.
Process Display:	Displays up to 5% over and 5% under span limits.
Process Variable Input Offset:	Reading adjustable ± Controller Span. +ve values added to Process Variable, -ve values subtracted from Process Variable
Sensor Break Detection:	Thermocouple & RTD - *Control goes to pre-set power value. High & Sensor Break alarms activate.* Linear *(*4 to 20mA, 2 to 10V and 1 to 5V only) - *Control goes to pre-set power value. Low & Sensor Break alarms activate.*
Isolation:	Isolated from all outputs (except SSR driver) at 240V AC.

© West Control Solutions 2012

Supported Thermocouple Types & Ranges:

Type	Range	°C Range °F
B	+100 to 1824°C	+211 to 3315°F
C	0 to 2320°C	32 to 4208°F
D	0 to 2315°C	0 to 4199°F
E	-240 to 1000°C	-400 to 1832°F
J	-200 to 1200°C	-328 to 2192°F*
K	-240 to 1373°C	-400 to 2503°F*
L	0 to 762°C	32 to 1402°F*
N	0 to 1399°C	32 to 2551°F*
PtRh 20%:40%	0 to 1850°C	32 to 3362°F
R	0 to 1759°C	32 to 3198°F
S	0 to 1762°C	32 to 3204°F
T	-240 to 400°C	-400 to 752°F*

Optional decimal place can be displayed up to 999.9°C/F

Thermocouple Calibration:
±0.1% of full range, ±1LSD (±1°C for internal CJC if enabled).
Linearization better than better ±0.2°C (±0.05 typical) on ranges marked ***** in the table above.
Linearization for other ranges is better than better than ±0.5°C.
BS4937, NBS125 & IEC584

Supported RTD Types & Ranges:

Type	Range	°C Range °F
3-Wire		
PT100	-199 to 800°C	-328 to 1472°F
NI120	-80 to 240°C	-112 to 464°F

Optional decimal place can be displayed up to 999.9°C/F

RTD Calibration
0.1% of full range, ±1LSD.
Linearization better than ±0.2°C (±0.05 typical).
PT100 input to BS1904 & DIN43760 *(0.00385Ω/Ω/°C).*

RTD Excitation:
Sensor current 150µA ±10%.

Lead Resistance
<0.5% of span error for max 50Ω per lead, balanced.

Supported Linear Types & Ranges:

Type	Range	Offset Range
mA DC	0 to 20mA DC	4 to 20mA DC
mV DC	0 to 50mV DC	10 to 50mV DC
V DC	0 to 5V DC	1 to 5V DC
V DC	0 to 10V DC	2 to 10V DC

Scalable from -9999 to 10000. Decimal point selectable from 0 to 3 places, but limited to 5 display digits (e.g 9999.9)

DC Calibration:
±0.1% of full range, ±1LSD.

DC Input Multi-Point Linearization:
Up to 15 scaling values can be defined anywhere between 0.1 and 100% of input.

Auxiliary Inputs

Supported Input Types & Ranges:

Type	Slot A Ranges	Slot B Ranges
mA DC	0 to 20, 4 to 20	0 to 20, 4 to 20
mV DC		0 to 50, 10 to 50, 0 to 100
V DC	0 to 5, 1 to 5, 0 to 10, 2 to 10	0 to 5, 1 to 5, 0 to 10, 2 to 10
Potentiometer		>2000W

Accuracy:
±0.25% of input range ±1 LSD.

Sampling Rate:
4 per second.

Resolution:
16 bits.

Impedance:
>10MΩ resistive, except DC mA (10Ω) and V (47kΩ).

Sensor Break Detection:
4 to 20mA, 2 to 10V and 1 to 5V ranges only. *Control goes to pre-set power value if Aux Input is the active setpoint source.*

Isolation:
Reinforced safety isolation from outputs and inputs (except to Digital Input B).

Auxiliary Input Scaling:
Scalable as Remote Setpoint (RSP) input between –1999 and 9999,constrained within setpoint limits.

Digital Inputs

Volt-free contacts (or TTL):
Open contacts (>5000Ω) or 2 to 24VDC signal = Logic High
Closed contacts (<50Ω) or -0.6 to +0.8VDC signal = Logic Low.

Isolation:
Reinforced safety isolation from inputs and other outputs.

Digital Input Sensitivity:
Edge Sensitive. Requires High-Low or Low-High transition to change function. Response within <0.25 second.

Ref DS-PV4-0112-3-EN
© West Control Solutions 2012

Selectable Digital Input Functions:	**Function**	**Logic High**	**Logic Low**
	Internal Setpoint Select	Local SP1	Alternate SP
	Auto/Manual Control Select	Automatic	Manual Mode
	Control Outputs	Enabled	Disabled

Outputs-Single Relay

Type & Rating:	Single pole double throw (SPDT); 2A resistive at 120/240VAC.
Lifetime:	>500,000 operations at rated voltage/current.
Isolation:	Reinforced safety isolation from inputs and other outputs.

Outputs-Dual Relay

Type & Rating	Single pole single throw (SPST),2A resistive at 120/240VAC. Dual relay modules have shared common.
Lifetime:	>200,000 operations at rated voltage/current.
Isolation:	Reinforced safety isolation from inputs and other outputs.

Outputs-Quad Relay

Type & Rating:	Single pole single throw (SPST),2A resistive at 120/240VAC. Dual relay modules have shared common.
Lifetime:	>500,000 operations at rated voltage/current.
Isolation:	Reinforced safety isolation from inputs and other outputs.

SSR Driver

Drive Capability	SSR driver voltage >10V into 500Ω minimum.
Isolation:	Reinforced safety isolation from inputs and other outputs.

Triac

Operating Voltage:	20 to 280Vrms (47 to 63Hz)
Current Rating:	0.01 to 1A (full cycle rms on-state @ 25°C); de-rates linearly above 40°C to 0.5A @ 80°C.
Isolation:	Reinforced safety isolation from inputs and other outputs.

Linear DC

Ranges	0 to 5, 0 to 10, 1-5, 2 to 10V & 0 to 20, 4 to 20mA (selectable) with 2% over/under-drive when used for control outputs.
Resolution:	8 bits in 250mS (10 bits in 1s typical, >10 bits in >1s typical).
Accuracy:	±0.25% of range, (mA @ 250Ω, V @ 2kΩ). Degrades linearly to ±0.5% for increasing burden (to specification limits).
Isolation:	Reinforced safety isolation from inputs and other outputs.

Transmitter PSU

Power Rating:	24V nominal (19 to 28V DC) into 910Ω minimum resistance. (*Option to use DC Linear output as 0-10V stabilised PSU*).
Isolation:	Reinforced safety isolation from inputs and other outputs.

Communications

PC Configuration

Connection:	RS232 via PC Configurator Cable to RJ11 socket under case.
Isolation:	Not isolated from input or SSR Driver outputs. For bench configuration only.

RS485

Connection:	Locates in Option Slot A. Connection via rear terminals (*refer to wiring diagram*).
Protocol:	Modbus RTU.
Slave/Master Mode	Slave address range 1-255 or Setpoint master mode.
Supported Speeds:	4800, 9600, 19200, 38400, 57600 or 115200 bps.
Data Type:	8 data bits and 1 stop bit. Odd, even or no parity.
Isolation:	240V reinforced safety isolation from all inputs and outputs.

Ethernet

Connection:	Locates in Option Slot A. Connection via RJ45 connector on top of case.

© West Control Solutions 2012

Protocol:	Modbus TCP. Slave only.
Supported Speed:	10BaseT or 100BaseT
Isolation:	240 V reinforced safety isolation from the supply, inputs and outputs (except SSR Drivers).

Loop Control

Tuning Types:	Pre-Tune, Auto Pre-Tune, Self-Tune or Manual Tuning.
Proportional Bands:	Primary & Secondary (e.g. Heat & Cool) 0.5% to 999.9% of input span in 0.1% increments, or On/Off control.
Automatic Reset:	Integral Time Constant, 1s to 99min 59s and OFF
Rate:	Derivative Time Constant, 1s to 99 min 59s and OFF
Manual Reset:	Bias 0 to 100% (-100% to +100% Primary & Secondary).
Deadband/ Overlap:	–20% to +20% of Primary + Secondary Proportional Band.
ON/OFF Differential:	0.1% to 10.0% of input span
Auto/Manual Control:	Selectable with “bumpless” transfer when switching between Automatic and Manual control.
Cycle Times:	Selectable from 0.5s to 512s.
Setpoint Ramp:	Ramp rate selectable 1 to 9999 LSDs per hour and infinite.

Alarms

Alarm Types:	Up to 5 alarms selectable as Process High, Process Low, Band, Deviation, Rate of Signal Change (per minute), Sensor/input Break, Loop Alarm. Band and Deviation (high or low) alarm values are relative to the current setpoint value.
Alarm Hysteresis:	A deadband from 1 LSD to full span (in display units) for Process, Band or Deviation Alarms. Rate Of Change Alarm hysteresis is the shortest time (1 to 9999 secs) the rate of change must be above the threshold for the alarm activate, or fall below the threshold to deactivate. **Note:** If the duration is less than this time, the alarm will not activate no matter how fast the rate of rise.
Combination Alarm Outputs:	Logical OR of alarms 1 & 2, 1 to 3, 1 to 4 or 1 to 5. Logical AND of alarms 1 to 5 with Profiler Events 1 to 5.

Operating conditions (for indoor use)

Temperature:	0°C to 55°C (Operating), –20°C to 80°C (Storage).
Relative Humidity:	20% to 95% non-condensing.
Supply Voltage and Power:	*Mains versions:* 100 to 240VAC ±10%, 50/60Hz, 20VA. *Low voltage versions:* 20 to 48VC 50/60Hz 15VA or 22 to 65VDC 12W.

Environmental

Standards:	CE, UL, cUL.
EMI:	Complies with EN61326.
Safety Considerations:	Complies with EN61010-1 & UL61010C-1. Pollution Degree 2, Installation Category II.
Front Panel Sealing:	To IP66 (IP65 front USB connector). IP20 behind the panel.

Display

Display Type:	160 x 80 pixel, monochrome graphic LCD with a dual colour (red/green) backlight.
Display Area:	66.54mm (W) x 37.42mm (H).
Display Characters:	0 to 9, a to z, A to Z, plus ( ) - and _
Trend View:	120 of 240 data points shown in a scrollable window. Data is not retained when power turned off or if time base is changed.
Trend Data:	Any active alarm plus PV (solid) & SP (dotted) at sample time or Max/Min PV between samples (candle-stick graph).
Trend Sample Rate:	1; 2; 5; 10; 15; 30 seconds or 1; 2; 5; 10; 15; 30 minutes.

Additional digital input options

Selectable Digital Input Functions:

Function	Logic High	Logic Low
Profile Run/Hold	Hold	Run
Hold Segment Release	Release	No Action
Profile Abort	Abort	No Action

© West Control Solutions 2012

	Data Recorder	Stop	Start
Digital Input Sensitivity:	Edge Sensitive. Requires High-Low or Low-High transition to change function. Response within <0.25 second		

Additional communications options - usb

Connection:	Locates in Option Slot C. Connection via front mounted connector.
Protocol:	USB 1.1 or 2.0 compatible. Mass Storage Class.
Supply Current:	Up to 250mA.
Targeted Peripheral:	USB Memory Stick.
Isolation:	Reinforced safety isolation from all inputs and outputs.

Additional alarms options

Combination Alarm Outputs	Logical AND of alarms 1 to 5 with Profiler Events 1 to 5.

Data recorder

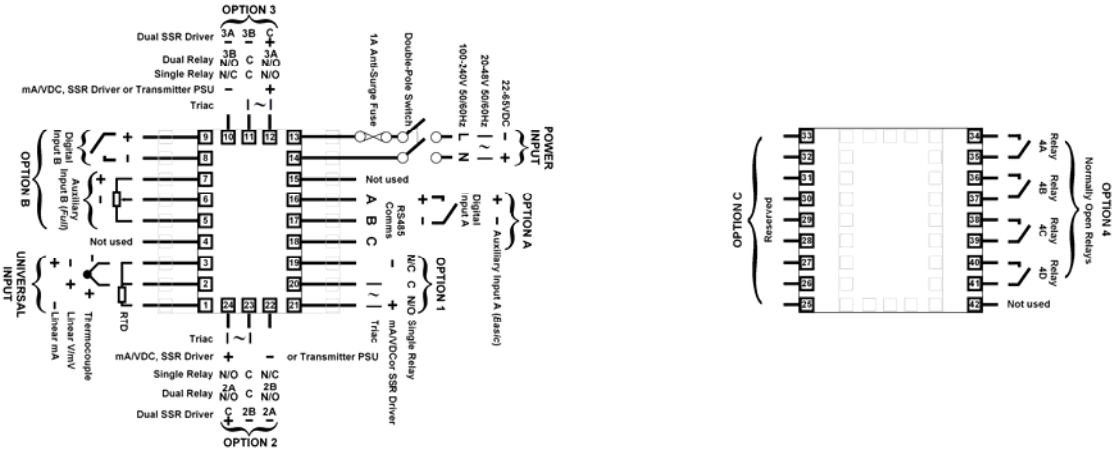
Recording Memory:	1Mb non-volatile flash memory. Data retained when power is turned off.
Recording Interval:	1; 2; 5; 10; 15; 30 seconds or 1; 2; 5; 10; 15; 30 minutes.
Recording Capacity:	Dependant on sample rate and number of values recorded. Two values can be recorded for up to 7 days at 10s intervals. More values or faster sample rates reduce the maximum duration.
RTC Battery Type:	CR 1616 3V Lithium. Clock runs for >1 year without power.
RTC accuracy	Real Time Clock error <1second per day.

Profiler

Profile Limits	Number of profiles = 64 maximum. Total number of segments (*all programs*) = 255 maximum.
Loop Back	1 to 9999 loops back to specified segment.
Profile Cycling	1 to 9999 or Infinite repeats per profile.
Sequence Repeats	1 to 9999 or Infinite repeats of joined profile sequences.
Segment Types	Ramp Up/Down over time, Ramp Rate Up/Down, Step, Dwell, Hold, Join A Profile, End or Repeat Sequence Then End.
Timebase	hh:mm:ss (Hours, Minutes & Seconds).
Segment Time	Maximum segment time 99:59:59 hh:mm:ss. Use loop-back for longer segments (e.g. 24:00:00 x 100 loops = 100 days).
Ramp Rate	0.001 to 9999.9 display units per hour.
Hold Segment Release	Release With Key Press, At Time Of Day or Digital Input.
Start From	1st segment starts from current setpoint or current input value.
Delayed Start	After 0 to 99:59 (hh:mm) delay, or at specified day(s) & time.
Abort Action	Keep Last Profile Setpoint, Use Controller Setpoint or Control Outputs Off.
Power/signal Loss Recovery	Continue Profile, Restart Profile, Keep Last Profile Setpoint, Use Controller Setpoint or Control Outputs Off.
Auto-Hold	Hold if input >Band above and/or below SP for each segment.
Profile Control	Run, Manual Hold/Release, Abort or jump to next segment.
Segment Events	Events turn on for the duration of the segment. For End Segments, the event state persists until another profile starts, the user exits from profiler mode, or the unit is powered down.

© West Control Solutions 2012

Wiring Connections



Ordering Code

V4 - 0 - X - X - X - X - X - X - X - X - X - X - X

Unit Type	
Controller	C
Controller with USB Port	U
Controller/Recorder with USB Port	R

Profiler Option	
Not Fitted	0
Profiler	P

Supply Voltage	
100-240V AC	0
24-48V AC or DC	2

Option Slot 1	
Not Fitted	0
Relay Output	1
DC Drive Output for SSR	2
Linear DC Output	L
Triac Output	8

Option Slot 2	
Not Fitted	0
Relay Output	1
DC Drive Output for SSR	2
Linear DC Output	L
Triac Output	8
Dual Relay Output	9
Dual SSR Driver Output	S
24V DC Transmitter Power Supply	T

Display Language	
1	English
2	French
3	German
4	Italian
5	Spanish

Option Slot C	
0	Not Fitted
1	*Reserved for future options*

Option Slot B	
0	Not Fitted
R	Aux input B

Option Slot A	
0	Not Fitted
1	RS485 Serial Comms
3	Digital Input 1
4	Remote Setpoint (RSP) Input A
5	Ethernet Port

Option Slot 4	
0	Not Fitted
1	4 Relay Output

Option Slot 3	
0	Not fitted
1	Relay Output
2	DC Drive Output for SSR
L	Linear DC Output
8	Triac Output
9	Dual relay Output
S	Dual SSR Driver Output
T	24VDC Transmitter Power Supply

West Control Solutions – International Sales and Support

CHINA
Setra-ICG (Tianjin Co., Ltd.
No.28 Wei 5 Road,
The Micro-Electronic Industry Park TEDA,
Xiqing District, Tianjin 300385
Tel: +86 22 8398 8098 Fax: +86 22 8398 8099
Sales Hotline: 400 666 1802
e-mail: China@West-CS.com

GERMANY
PMA Prozeß- und, Maschinen- Automation GmbH,
Miramstraße 8, 7D -34123 Kassel
Tel: +49 (561) 505-1307 Fax: +49 (561) 505-1710
e-mail: EnquiriesGermany@West-CS.com

USA
West Control Solutions
1675 Delany Road, Gurnee, IL 60031-1282
Tel: 800 866 6659 Fax: 847 782 5223
e-mail: InquiriesUSA@West-CS.com

FRANCE
Tel: +33 (1) 77 80 90 40 Fax:+33 (1) 77 80 90 50
e-mail: EnquiriesFrance@West-CS.com

UNITED KINGDOM
West Control Solutions
The Hyde Business Park, Brighton, East Sussex, BN2 4JU
Tel: +44 (0)1273 606271 Fax: +44 (0)1273 609990
e-mail: EnquiriesUK@West-CS.com

Brochures and datasheets are available for the complete range of West Control Solutions products, contact your local sales office or visit our website at: **www.west-cs.com** for more information.

Specifications are subject to change without notice, as a result of continual development and improvement, E&OE

© West Control Solutions 2012