¹/₁₆ - ¹/₈ MAXVU EXTRUSION CONTROLLER **CONCISE PRODUCT MANUAL (59578-3)**

CAUTION: Installation should be only performed by technically competent personnel. It is the responsibility of the installing engineer to ensure that the configuration is safe. Local regulations regarding electrical installation & safety must be observed - e.g. US National Electrical Code (NEC) and/or Canadian Electrical Code. Impairment of protection will occur if the product is used in a manner not specified by the manufacturer.

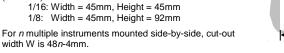
1. INSTALLATION

Installation Guidance

- Standards compliance shall not be impaired when fitted into the final installation
- Designed to offer a minimum of Basic Insulation only
- Ensure that supplementary insulation suitable for Installation Category II is achieved when fully
- To avoid possible hazards, accessible conductive parts of the final installation should be rotectively earthed in accordance with EN61010 for Class 1 Equipment.
- Output wiring should be within a Protectively Earthed cabinet.
- Sensor sheaths should be bonded to protective earth or not be accessible
- Live parts should not be accessible without the use of a tool.
- When fitted to the final installation, an IEC/CSA APPROVED disconnecting device should be used to disconnect both LINE and NEUTRAL conductors simultaneously
- Do not to position the equipment so that it is difficult to operate the disconnecting device

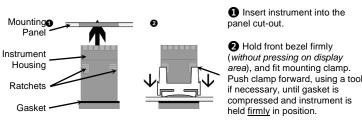
Panel-Mounting

The mounting panel must be rigid, and may be up to 6.0mm (0.25inch) thick. Cut-out sizes are:





Tolerance +0.5, -0.0mm



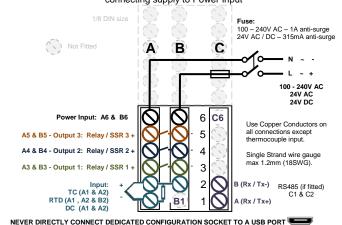


CAUTION: For an effective IP65 seal against dust and moisture, ensure gasket is well compressed against the panel, with the 4 tongues located in the same

Rear Terminal Wiring

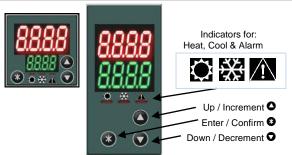
This diagram shows all possible option combinations. Check the product configuration before wiring.

CAUTION: Check information label on housing for correct operating voltage before connecting supply to Power Input



2. FRONT PANEL

Displays & Indicators



Keypad & General Navigation

Menu navigation, parameter editing and keypad use are described below. See the relevant manual sections for further information and exceptions.

General keypad usage & parameter editing:

Press O or O keys to navigate between parameters

To edit a parameter, press 3. The Parameter name (lower display) flashes when the parameter above can be edited / adjusted.

Press or to change the parameter value (upper display).

Edited values stop changing at the parameters limits. A further press of O or • past the parameter limit "wraps" the value back to the start

(e.g. 0, 1, 2... ...98, 99,100 **4** 0, 1, 2...)

To confirm the change, press within 60s otherwise the change is rejected.

To navigating to Setup or Advance Configuration from User Mode:

Press and hold down 3 and press of for setup Mode, or

Press and <u>hold down</u> ❸ and press **⑦** for advanced configuration.

Returning to User Mode from other modes:

After 120 seconds without key activity the unit returns automatically to the 1st User mode screen, or

Press and hold down 3 and press 4 to move back up one level.

FIRST POWER-UP (SETUP MODE)

When first powered up or after a factory reset (default) the instrument enters Setup

Important Note: The device remains in Setup, or will keep powering up back into Setup Mode, until all parameters have been reviewed and the user exits the Setup Mode

Setup mode lock Enter lock code to continue. Default is 10. S.Loc code Display **LYPE** -200 - 1200°C -128.8 - 537.7°C -328 - 2192°F -199.9 - 999.9°F -240 – 1373°C -400 - 2503°F PT100 -199 – 800°C -328 - 1472°F

-128.8 - 537.7°C -199.9 - 999.9°F -128 8 – 537 7°C -199.9 - 999.9°F B Thermocouple 100 - 1824°C 211 - 3315°F C Thermocouple 0 - 2320°C 32 - 4208°F L Thermocouple 0.0 – 537.7°C 0 - 762°C 32 - 1403°F 32.0 - 999.9°F 32 - 2551°F R Thermocouple 0 – 1795°C

-240 – 400°C -400 - 752°F emperature displayed as °C. Input Units Un it emperature displayed as °F. Process Display No decimal places dEc.P Resolution

2 decimal places Not available for emperature decimal places inputs. Scale Input Upper Scale Input Lower Limit +100 display units to ange maximum. (Only visible in Setup Mode then 0 to 50mV is selected)

decimal place

32 - 3198°F

S Thermocouple

0 - 1762°C

32 - 3204°F

T Thermocouple

0 - 50mV DC

-128.8 – 400°C

-199.9 - 752.0°F

Input

Manual Powe

Control Disabled

Control Delayed

Scaled Range Range minimum to Scale Input Upper Limit -100 isplay units. (Only visible in Setup Mode when (to 50mV is selected) Output 1 Usage OUL I

Lower Limit

Heat Power Cool Power Non-Linear Cooling Alarm 1 Alarm 2 Alarm 1 or 2 Control loop alarm

2 x Integral time)

Output 3 Usage As Output 1 Usage Alarm 1 Adjust Range minimum to range maximum **DFF** disables the alarm. Default high alarm Alarm 2 Adjust Range minimum to range maximum **DFF** disables the alarm. Default low alarm Setpoint Adjust SP Target setpoint adjustable between setpoint upper and lower limits Use current PID control terms or Automatic Tuning LunE Start/Stop nanually tune Start a pre-tune routine tart the tune at setpoint 4. USER MODE Screen Name Screen Usage and Visibility Display Basic Setpoint Effective Basic Setpoint Control enabled - automatic Control 1st Screen Setpoint Variable control. Press **O** or **O** to <u>instantly</u> adjust Automatic Mode) setpoint. If ramping, the target setpoint is shown while adjusting. **OFF** replaces the setpoint if control is disabled. Manual Basic Setpoint Control enabled - manual Process Variable control. Press **○** or **○** to <u>instantly</u> adjust

As Output 1 Usage

Display

Output 2 Usage

Manual Mode)

Power

Adjustment Range & Description Default

Value

Basic Setpoint Control 1st Screen (Manual Mode) manual power. The power value is shown a P_{XXX}. The following screens are not shown in Basic User Mode (see the display sub-menu **d 5P** in Advance configuration – Section 6) User 1st Screen Effective Process Available in automatic control mode. (utomatic Mode) Setpoint /ariable If ramping, the target setpoint is shown while adjusting. **OFF** replaces setpoint if control is disabled **dL9** replaces setpoint if control delayed. Available in manual control mode Jser 1st Screen Manual Process

Important: To appear in the User Mode the visibility setting for any of

Manual Power value is shown as Pxxx

Variable

the parameters below must be SHUU in the OPEr sub-menu.					
Alarm Status	ALSE	Active Alarms	Active only when alarms are active. I = Alarm 1 active = Alarm 2 active L = Loop Alarm active. Any combination can be displayed here		
Latch Status	LAEH	Latched Outputs	Active only when an output is latched on. I = Output 1 Output 2 Output 3 Clear by pressing .		
Maximum PV	PAR .	Value	Clear by pressing ❸.		
Minimum PV	ייי הט	Value	Clear by pressing ❸.		
Control Enable	EntL	OFF	Control output(s) disabled. (except in manual mode)		
		On	Control output(s) enabled. PID or On-Off control available.		
Manual Control Enable	LUCF	OFF	Instrument in automatic control mode (manual control OFF).		
		<u>O</u> n	Manual control ON. Power is shown as \mathbf{P}_{xxx} in 1st User screen.		

Messages & Error Codes

ZXXX

dL4

Some messages provide useful information about the process, others indicate error, or problem with the process variable signal or its wiring Caution: Do not continue with the process until the issue is resolved.

Screen Meaning and Visibility

Manual power value replaces the setpoint

Control is disabled, control outputs are off.

Visible if control delayed by Delayed Start

Display Display Alarm Active One or more alarms are active (alternates with PV). Optional – see **d .5P** One or more output are latched on (alternates Output Latched with PV), and no alarm is active Process variable input >5% over-range Input Over Range Process variable input >5% under-range. Input Under Range Input Sensor Break Break detected in process variable input ensor or wiring. Selected input range has not been calibrated. Un-calibrated Input

Screen Meaning and Visibility Display Display Automatic Tuning Tuning is active (alternates with setpoint). Automatic Tuning If the tune fails the display alternates between the tune error code and the setpoint. Remains visible until tune set to off. Errors EEr i PV is within 5% of setpoint FE-5 Setpoint is ramping Er3 Control is ON/OFF LE-4 ontrol is manua LErS Pulse tune not able to run **LE-E** Sensor break FEL. Timer running Control is disabled

5. SPECIFICATIONS

UNIVERSAL INPUT

Thermocouple +0.25% of full range, +0.4% of full range below 110°C with 1dp Calibration: ranges, ±1LSD (±1°C for Thermocouple CJC). BS4937, NBS125 &

PT100 Calibration: $\pm 0.25\%$ of full range, $\pm 0.4\%$ of full range above 520°C with 1dp ranges, ±1LSD. BS1904 & DIN43760 (0.00385Ω/Ω/°C).

DC Calibration: ±0.2% of full range, ±1LSD.

Sampling Rate: 4 per second. Impedance: >10MΩ resistive

Sensor Break Thermocouple and RTD ranges only. Control outputs turn off. Detection

Isolated from all outputs (except SSR driver) by at least BASIC Isolation:

isolation. Universal input must not be connected to operator accessible circuits if relay outputs are connected to a hazardous voltage source. Supplementary insulation or input grounding would then be required. Isolated from Mains Power Input by basic

RELAYS (OPTIONAL)

OUTPUTS

Contacts: SPST Form A relay; current capacity 2A at 250VAC. Lifetime: >150.000 operations at rated voltage/current, resistive load. Isolation Basic Isolation from universal input and SSR outputs.

SSR Drivers (OPTIONAL)

Drive Capability: SSR drive voltage >10V at 20mA

Isolation Not isolated from universal input or other SSR driver outputs.

SERIAL COMMUNICATIONS (OPTIONAL)

Physical: RS485, at 1200, 2400, 4800, 9600, 19200 or 38400 bps

Protocols Modbus RTU

Isolation: Basic safety isolation from Universal input and SSR. Basic safety isolation to Mains and Relay Circuits.

OPERATING CONDITIONS

For indoor use only, mounted in suitable enclosure Ambient Temp: 0°C to 55°C (Operating), -20°C to 80°C (Storage).

Relative Humidity 20% to 95% non-condensing Altitude

Supply Voltage &

100 to 240VAC ±10%, 50/60Hz, 7.5VA (for mains powered versions), or

24VAC +10/-15% 50/60Hz 7.5VA or 24VDC +10/-15% 5W

(for low voltage versions).

ENVIRONMENTAL

Standards CE, UL and cUL

EMI: Complies with EN61326-1:2013. Safety Complies with UL61010-1 Edition 3, Considerations: Pollution Degree 2, Installation Category II.

Front Panel Sealing: Front to IP65 when correctly mounted, Rear of panel to IP20.

PHYSICAL

 $^{1}/_{16}$ Din = 48 x 48 mm, Front Bezel Size $/_{8}$ Din = 48 x 96 mm

Depth Behind Panel: 67mm with sealing gasket fitted

0.20kg maximum. Weight:

6. ADVANCED CONFIGURATION

The advanced configuration gives access to all of the features of the unit.

Advanced Configuration Mode Navigation

Press O or to navigate to the required sub-menu, then press to enter.

Advanced Configuration Main Menu

Advanced Configuration Mode Lock Code	A.Loc		ck code to enter Advanced Configuration.
Screen Name	Lower Display	Upper Display	Sub-Menu Usage and Visibility
User Settings		USEr	Provides access to Control and Manual Mode enable/disable. Only shown if Basic User mode is select in d 15P (see below).
Input Setup		InPt	Configuration parameters for the process input.
Input Calibration		CAL	Single or two point calibration adjustments for the process input.
Output Setup		DULP	Configuration parameters for the outputs.
Control Setup	Adu	COnt	PID control tuning & configuration parameters. Hidden if no control output set.
Setpoint Setup	1100	SP	Setpoint settings.
Alarm Setup		ALLU	Alarm configuration parameters.
Communications Setup		Corn	Modbus communications settings. Only shown if RS485 option is fitted
Display Settings		d ,5P	Enable Basic Mode and change lock codes.
Operator Setup		OPtr	Control what appears in User Mode screen.
Product Information		InFo	View product serial number and manufacturing information.

User Sub-Menu: USEr

Provides access to Control Enable/Disable.

Screen Name	Lower Display	Upper Di Descripti	splay Adjustment Range & on	Default Value
Alarm Status	ALSE	Active Alarms	Visible when alarms are active - L2 I are active. I = Alarm 1 active 2 = Alarm 2 active 3 = Loop Alarm active	Blank
Latch Status	LALH	Latched Alarms	Active when an output is latched - 123 are active. Output 1 Output 2 Output 3	Blank
Maximum PV	LUB		Max/Min PV recorded whilst	
Minimum PV	ייי ניז		powered up or since last reset. To clear press ❸ then to select YE5. Press ❸ to accept.	
Control Enable	Entl	OFF	Control output(s) disabled.	<u>On</u>
		Dn.	Control output(s) enabled. PID or On-Off control available.	
Manual Control Enable	LUCF	OFF	Instrument in automatic control mode (manual control OFF).	OFF
		<u>D</u> n	Manual control ON. Power is shown as P xxx in 1 st User screen.	

Input Sub-Manus JoPh

Input Sub-Menu:	IULE				
Screen Name	Lower Display	Upper Di Descript	isplay Adjustment ion	Range &	Default Value
Input Type	FALE	Options a (section 3	available same as ii 3)	n setup mode	FC-h
Input Units	Un it	Ε	Temperature displa	ayed as °C	E
		F	Temperature displa	ayed as °F	
Process Display	dEc.P	0000	No decimal places		0000
Resolution		0.000	1 decimal place		
		00.00	2 decimal places	Not available	
		0.000	3 decimal places	for temperature inputs.	
Scaled Range	ScUL	Scale Input Lower Limit +100 display units to			Input
Upper Limit		range ma	aximum		max Lin=1000
Scaled Range	ScLL		inimum to Scale In	out Upper Limit -	Input
Lower Limit		100 displ	ay units		min Linear=0
Input Filter Time	Filt	OFF or C	0.5 to 100.0 seco	nds in 0.5	2.0

Screen Name	Lower Upper Display Adjustment Range & Display Description			Default Value
Cold Junction Compensation	EAE	On	Enables the internal thermocouple CJC.	<u>0</u> r
		OFF	Disables the internal CJC. External compensation must be provided for thermocouples.	-

Input Calibration Sub-Menu: [AL

Single or two point calibration adjustments for the process input.

If the error is not constant across the sensor range, measure the error at a low point and high point in the process, and use two point calibration to correct it.

nigh point in the process, and use two point calibration to correct it.					
Screen Name	Lower Display	Upper Display Adjustment Range & Description	Default Value		
Single Point Offset	OFF5	Shifts the input value up or down by the offset amount across the entire range.	0		
Low Calibration Point	L.CAL	The value at which the low point error was measured.	Lower Limit		
Low Offset	L.OFF	Enter an equal, but opposite offset value to the observed low point error.	0		
High Calibration Point	H.CAL	The value at which the high point error was measured.	Upper Limit		
High Offset	H.OFF	Enter an equal, but opposite offset value to the observed high point error.	0		

Output Setup Sub-Menu: DULP Screen Name Lower Upper Disc

Screen Name	Display	Descript	ion	Value
Output 1 Usage	ONF I	HEAL	Heat Power	
		COOL	Cool Power	
		FILL	Non-Linear Cooling	
		AL I	Alarm 1	HERL
		AL2	Alarm 2	
		AL 12	Alarm 1 or 2	
		LooP	Control loop alarm (2 x Integral time)	
Output 1 Alarm	Act I	d 1.	Output changes with the alarm	
Action		rEu	Output changes in opposition to alarm	d 11
Output 1 Alarm	LAc I	OFF	Latching off	OFF
Latching		D ∩	Latching on	
Output 2 Usage	0NF5	As Outpu	t 1 Usage	AL I
Output 2 Alarm Action	AcF5	As Outpu	t 1 Alarm Action	ط ۱۰
Output 2 Alarm Latching	LAc2	As Outpu	t 1 Alarm Latching	OFF
Output 3 Usage	OUE3	As Outpu	t 1 Usage	AL2
Output 3 Alarm Action	Act3	As Outpu	t 1 Alarm Action	d 11
Output 3 Alarm Latching	LAc3	As Outpu	t 1 Alarm Latching	OFF

Control Sub-Menu: [Ont

Screen Name

PID control tuning & configuration parameters. Hidden if no control outputs are set. Lower Upper Display Adjustment Range &

	Display	Description	Value
Heat Proportional Band	н_Рь	In display units. 0.0 (<i>Dn.DF</i>) and range: 0.5 to 999.9 units.	15 1
Cool Proportional Band	С_РЬ		15 1
Automatic reset (integral time)	In.E	/ second to 99 minutes 59 seconds and OFF	5.00
Rate (derivative time)	dEr.t	OFF 0 seconds to 99 minutes 59 seconds	1. 15
Overlap/ Deadband	0_d	In display units, range -20 to +20% of Heat and Cool Proportional Band	0
ON/OFF differential	d iFF	In display units, centred about the setpoint, range: 0.1% to 10.0% of input span	8
Loop Alarm Time	LAL	Visible when using On/Off control (i.e. when H_Pb or C_Pb = On.OF) Sets the time to wait before the loop alarm becomes active.	99.59
Manual Reset (Bias)	ь а	0 to 100% (- 100% to 100% if heat/cool control)	25
Soft Start Time	55£ 1	0 (0FF)to 60 hours	OFF
Soft Start Setpoint	SSSP	Soft start target setpoint adjustable between scale input upper and lower limits	-240
Heat Cycle Time	НсУс	0. I to 5 12.0 seconds 0. I to 5 12.0 seconds	32.0

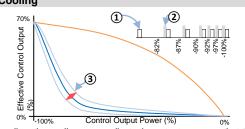
Screen Name	Lower Display	Upper Display Adjustment Range & Description	Default Value
Cool Cycle Time	СсУс		32.0
Heat and Cool output Inhibit	OPLC	Inhibits simultaneous switching of both heat and cool outputs.	OFF
Heat Power Limit	HPL	% power upper limit $m{ heta}$ to $m{ heta 00}$ %	100
Cool Power Limit	CPL	% power upper limit $m{ heta}$ to $m{ heta 00}$ %	100
Cooling Minimum	COOL	Minimum temperature at which water cooling will activate. Range minimum to range maximum.	150
Impulse Length	Ł.on	1 to 9999 seconds	10
Minimum off time	Ł.oFF	1 to 9999 seconds	50
Non-linear cooling adjust	C.AdJ	0 to 9999	5
Power Up Action	PUP	Powers up with control enable in the same state as on power fail	LASE
		Always powers up with control enabled	
Automatic Tuning Start/Stop	FunE	Use current PID control terms or manually tune	OFF
		Start a pre-tune routine	
		Start the tune at setpoint	

Soft Start



① At power on the unit will control to the Soft Start Setpoint, **555P**. ② Then remain at this value for the time defined by the Soft Start Time, **55£** . During this period the control cycle time is a ¼ of the value entered and the heat power limit, HPL, is used. (3) When soft start timer expires the unit returns to normal operation. The unit controls to the normal setpoint and from this point the heat power limit is not used by the controller.

Non-linear Cooling



With non-linear cooling, the cooling curve adjusts the output power so that the effective power over 0% to -70% is weaker. 1 The length of time the output will be on for is set by the parameter **Ł.on.** ② The minimum time the output will be off for is set by the parameter **Ł.oFF**. (3) When **C.RdJ** is set to a value greater than 0 the cooling is nonlinear and the value adjusts the characteristics of the curve.

Setpoint Sub-Menu: 5P

Screen Name	Lower Display	Upper Display Adjustment Range & Description	Default Value
Ramp Rate	rALE	The rate (in units / hour) from current PV to setpoint following power-up or control enable. From 0.00 I to 9999 or 0FF Setpoint changes also follow this rate.	OFF
Setpoint Upper Limit	SPuL	The maximum allowed setpoint value, from current setpoint to scaled upper limit.	Uppe Limit
Setpoint Lower Limit	SPLL	The minimum allowed setpoint value, from current setpoint to scaled lower limit.	Lower Limit

Alarm Sub-Menu: ALM

Screen Name	Lower Display	Upper Display Adjustment Range & Description	Default Value
Alarm 1 Type	AL IE	None	P_h :
		Ph Process High Alarm	
		P_L Process Low Alarm	
		Deviation Alarm	
		Band Alarm	
Alarm 1 Value	AL_ I	Range minimum to range maximum	1373
		OFF disables the alarm.	
Alarm 1 Hysteresis	HYS I	0 to full span.	
Alarm 2 Type	AL2F	As Alarm 1.	P_Lo
Alarm 2 Value	AL_2	Range minimum to range maximum	-240
		OFF disables the alarm.	
Alarm 2 Hysteresis	HYS2	0 to full span.	1

Screen Name	Lower Display	Upper Display Adjustment Range & Description	Default Value
Alarm Inhibit	iup i	Inhibit these alarms if active at power-up and on change in setpoint.	nont
		nonE None	
		Alarm 1	
		Alarm 2	
		Alarm 1 and Alarm 2	
Alarm Notification	Note	Alternating indication -AL- shown when these alarms are active.	1 2
		None	
		Alarm 1	
		Alarm 2	
		Alarm 1 and Alarm 2	
Alarm LED Indicator selection	R. Ind	Select the alarms that will show on the alarm LED indicator	1 6
		None	
		Alarm 1	
		Alarm 2	
		Alarm 1 and Alarm 2	
Sensor Break Alarm	SbAc	On activates both alarms when a sensor break is detected.	OFF

Communications Sub-Menu: Conn

Modbus communications settings. Only shown if RS485 option is fitted

Screen Name	Lower Display	Upper Display Adjustment Range & Description	Default Value
Modbus Address	Add	The device network address from 1 to 255	1
Baud Rate	bAud	The communications data rate in kbps from I.2 (1200), 2.4 (2400), 4.8 (4800), 9.5 (9600), 19.2 (19200), 38.4 (38400).	9.6
Parity	Prty	Parity checking: Odd , EuEn or nonE	nonE

Display Sub-Menu: d ,5P

Enable Basic Mode and change lock codes.

Screen Name	Lower Display	Upper Display Adjustment Range & Description	Default Value
Setup Lock Code	5.Loc	View and adjust lock code to allow entry to the Setup Mode. Adjustable from 1 to 9999 or DFF to allow unrestricted access	10
Advanced Configuration Lock Code	A.Loc	View and adjust lock code to allow entry to the Advanced Configuration. Adjustable from I to 9999 or OFF to allow unrestricted access	20
Basic Setpoint Control Enable/Disable	6ASc	Basic Setpoint Control allows user to only change the setpoint or manual power.	d ,5R
Reset to Defaults	dFLE	Reset all parameters back to their factory defaults Reset by pressing sand selecting 9E5	

Operator Sub-Menu: OPEr

Controls what appears in the User Mode when Basic Mode is disabled.

Screen Name	Lower Display	Upper Display	Sub-Menu Usage and Visibility	
PV Maximum	ran R			H idE
PV Minimum	וי היו	H IJE SHUJ	Hide or show parameters in User Mode when Basic Mode is disabled.	H idE
Alarm Status	ALSE			H idE
Latch Status	LAFH			SHLJ
Control Enabled	EntL			н аЕ
Manual Control Enabled	החנד			H idE

Product Information Sub-Menu: InFo (Read-Only view)

Read-only view product serial number and manufacturing information.

Screen Name	Lower Display	Description	
Product Revision	PrL	The hardware/software revision level.	
Firmware Type	FŁYP	The firmware code type.	
Firmware Issue	155	The firmware version number	
Serial Number 1	SEr I	First four digits of serial number	
Serial Number 2	SE-2	Middle four digits of serial number	
Serial Number 3	5Er3	Last four digits of serial number	
Manufacture Date	4007	Date of Manufacture (mmyy)	