



ProCon 16, 31, 47, 75, 77 & HT. RVA 47. Mk2 Cascade Controller Commissioning Data. (Grey Housing)

The Mk2 RVA47 controller can be identified by the inclusion of the letter B after the Build Code stamped on the rear of the unit. The Build Code is located above the Live and Neutral terminals on the rear bottom right of the unit. (Viewed from the rear.)

To ensure that the RVA47 cascade controller operates satisfactorily the following sensors or substitute resistors must be installed.

A QAD21 Flow sensor

A QAD21 Return sensor (Optional)

A QAC32 Outside air sensor or Substitute Resistor simulating -1°C (620.Ohms) (Part # Res 620)

To ensure that the ProCon boiler can communicate with the RVA47 controller the following hardware must be connected to each LMU64 controllers mounted in the rear of each ProCon boiler.

1x OCI420 Communication Clip. Clipped into the right hand space on the front of the LMU64 controller.

1x OCI420 Wiring loom to be connected to the exposed PCB at the base of the OCI420 Clip X40 and to the exposed PCB at the base of the LMU64 controller X40.

Wiring Configuration and Type

The interconnecting cascade wiring from the RVA 47 to the ProCon boilers must be connected as follows: In a parallel configuration using screened cable. (The screening must be earthed)

The internal boiler pump wiring must be altered as follows.

The boiler pump must be connected to K1 (X02:02) and not K2 (X02:03)

RVA47 LPB Connections.

MB Pink

DB Purple

LMU64 / OCI420 Clip ProCon Boiler Connections.

X41 Connection Plug on front of OCI420.

#1 left hand terminal. DB Purple

#2 Right hand terminal. MB Pink

Communication Operation Indications

The RED LED on the OCI420 flashes to indicate the detected operational status of the ProCon boiler dictated by the LPB communication from the RVA47.

| LED FLASH STATUS | INTERPRETATION OPTIONS |
|--------------------------------|---|
| LED ON Constantly | OCI420 not configured to operate with LMU64 |
| LED OFF Constantly | OCI420 Configured. LPB Short Circuit / No Power. |
| LED ON 93% OFF 7% | OCI420 and LUM64 Not Compatible / LPB Address inadmissible. |
| LED ON 5% OFF 95% | Boiler being controlled via LPB and required to be not operating. |
| LED ON 5% OFF 20% ON 5% OFF70% | Boiler being controlled via LPB and required to be operating. |

Boiler and RVA47 Parameter Configuration

A number of parameters within each boiler must be altered to ensure correct operation of the system cascade communications.

Press and Hold the UP and DOWN PROG buttons on the facial of the boiler until H90 appears on the display.

Press the UP PROG button until the following parameters are displayed.

Alter the parameters as detailed using the PLUS and MINUS button.

Following the alteration of the final parameter press the INFO button to confirm the final alteration.

All previous alterations will be stored into the memory by pressing the UP PROG button to pass to the next parameter for alteration.

LMU64 ProCon Controller Parameter Alterations.

| PARAMETER | EXISTING | REQUIRED |
|-----------|---------------------|---|
| 516 | 18 | 30 |
| 552 | System Dependant | 80 |
| 604 Bit 0 | 0 | 1 |
| 605 | 1 | First boiler in cascade = 2 Second boiler in cascade = 3 Third boiler in cascade = 4 To the maximum number of boilers allowable in cascade boiler # 12 = 13 |
| 606 | 0 | 0 |

RVA47 Controller Parameter Alterations.

| PARAMETER | EXISTING | REQUIRED |
|-----------|----------|----------|
| 16 | 17 | 30 |
| 140 | 1 | 1 |
| 141 | 0 | 0 |
| 148 | 3 | 3 |

RVA 47 Fault Indication

If the sensors or ProCons connected to the RVA47 controller fail or are removed from circuit, an error message will be displayed on the left of the LCD screen.

Error Message Notation Er.

Once an error message is present the cause of the error can be traced by accessing function [50].

To access function [50], Open the flap of the controller and press the down Prog button twice. [50] Should appear in the left-hand side of the LCD display.

The figure shown in the center of the screen is the fault identification number.

The display can hold a number of faults but will only display 2 at any one time.

The second error can be accessed by pressing the + or – buttons.


Once a fault has been rectified the error number will disappear or be replaced with another fault number if further attention is required.

ProCon Fault Indication.

The following codes will be displayed on both the Boiler control panel and the RVA47 Unit.

Boiler Control Panel:

If the Boiler LMU64 Controller or RVA47 Unit detects an operational fault a relevant code is flashed alternately with the Time of Day display.

If the fault prevents the boiler from operating the  appears at the lower left corners of the display.

By pressing the INFO button on the display a full screen display will indicate the fault code.

By opening the opening the side-hinged cover / flap on the RVA47 unit and pressing the ▼ PROG button twice Line # 50 will indicate the fault code and give a brief description of the fault.

Faults can only be reset at the boiler by pressing the RESET button.

Prior to pressing the RESET button a note should be made of the fault code for future reference.

| Fault Code | Description |
|------------|--|
| E-0 | No Error Detected |
| E-10 | Outside Air Sensor Fault / Not Detected |
| E-20 | Flow Water Sensor Fault / Not Detected |
| E-26 | System Flow Sensor Faulty / Not Detected |
| E-28 | Flue Gas Sensor Fault / Not Detected |
| E-40 | Return Water Sensor Fault / Not Detected |
| E-46 | System Return Water Sensor Fault / Not Detected |
| E-50 | HWS Sensor Short Circuit 1 |
| E-52 | HWS Sensor Short Circuit 2 (Not Used) |
| E-58 | HWS Volt Free Switch Fault / Not Detected |
| E-60 | Faulty Room Sensor |
| E-61 | Faulty Room Sensor |
| E-62 | Incorrect Room Unit Connected |
| E-77 | Air Pressure Sensor Not Detected (Not Used) |
| E-78 | Water Pressure Sensor Defective (Not Used) |
| E-81 | LPB Short Circuit (Boiler Cascade Wiring) |
| E-82 | LPB Address Conflict (Boiler Cascade Settings) |
| E-86 | Short Circuit on PPS Connection (Not Used in ProCon Configuration) |
| E-91 | EEPROM |
| E-92 | Hardware Malfunction |
| E-100 | Conflict Between Time of Day Master Control (Boiler / QAA73 / RVA47) |
| E-105 | Annual Service Due (QAA73 Service Tool Required to Rest Timer on HT Range) |
| E-110 | Boiler Water Temperature Overheat |
| E-111 | Boiler Temperature Too High (Auto Resetting) |
| E-113 | Flue Gas Temperature overheat (Not Used) |
| E-117 | High System Water Pressure Sensor (Not Used) |
| E-118 | Low System Water Pressure Sensor (Not Used) |
| E-119 | System Water Pressure Switch Activated (Below 0.8 bar) |
| E-124 | Boiler Temperature Too High (Auto Resetting) |
| E128 | Flame Extinguished During Operation (LMU Version D) |
| E129 | Air Supply Error. Fan speed incorrect during operation. (LMU Version D) |
| E-130 | Flue Temperature Too High (Auto Resetting) |
| E-131 | Fault With Burner |
| E-132 | External Safety Interlock Activated (Open Circuit) |
| E-133 | No Flame Detected After Final Ignition Attempt |
| E-134 | Flame Extinguished During Operation LMU Version C) |
| E-135 | Air Supply Error. Fan speed incorrect during operation. (LMU Version C) |
| E-140 | LPB Segment / Address Not Recognized (Boiler Cascade Settings) |
| E-142 | LPB Missing Partner (Boiler Cascade Settings) |
| E-145 | Wrong Device Connected to PPS Circuit (Not Used in ProCon Configuration) |
| E-146 | Unrecognized Plant Configuration |
| E-147 | Burner Modules Not Connected (PPS Circuit Not Used in ProCon Configuration) |
| E-148 | LPB Interface Not Configured (Boiler Cascade Settings) |
| E-150 | General Boiler Fault |
| E-151 | Boiler LMU64 Controller Malfunction |
| E-152 | Boiler LMU64 Controller Parameter Programming Error |
| E-153 | Boiler Control Interlocked |
| E-154 | Boiler Operating Outside of Predefined Parameters. (System Hydraulic Error.) |
| E-160 | Fan Not Reaching Set Point |
| E-161 | Combustion Fan Speed Too High |
| E-162 | Air Pressure Switch Fault (Not Used) |
| E-164 | Flow Switch / Pressure Switch Open (Not Used) |
| E-166 | Air Pressure Switch Fault (Not Used) |
| E-180 | Boiler Operating in Chimney Mode 100% Output |
| E-181 | Boiler Operating in Commissioning Mode |
| E-183 | Boiler Controller / QAA73 Room Unit in Parameter Setting Mode |

Complete RVA47 Cascade Controller End User Parameter Setting.

To enter the End User Parameter Program, the door must be opened and one of the UP or DOWN Prog buttons must be depressed.

A number between 1 & 50. Will appear in a bracket on the left of the display window. These can be paged through by using the UP or DOWN buttons.

To alter or input the required data in the selected program line # use the + or - buttons.

To leave the End User Parameter Setting Menu press the AUTO button.

The defaults indicated below are for standard systems.

If additional control features are required alteration will have to be made.

Please refer to the RVA47 manual for additional details.

#, -, --- Indicates where an input can be made if required.

Indicates where an input can not be made and a sensed / attenuated figure is displayed. 'OFF' will be displayed if the +/- buttons are used.

| [#] | Description | Range | Wall Mounted Boiler RVA47 | ProCon HT 150 & 225 Standalone | ProCon HT 150 & 225 Master Cascade |
|-----|---|-----------------|---------------------------|--------------------------------|------------------------------------|
| | End User Level | | | | |
| 1 | Time of Day | 00:00-24:00 | As Required | As Required | As Required |
| 2 | Weekday | 1-7 | As Required | As Required | As Required |
| 3 | Date | 00:00 | As Required | As Required | As Required |
| 4 | Year | 1900-3000 | As Required | As Required | As Required |
| 5 | Day of Week | 1.7 1.5 6.7 1-7 | As Required | As Required | As Required |
| 6 | Heating Time Switch 1st On Time | 00:00-24:00 | 06:00 | 06:00 | 06:00 |
| 7 | Heating Time Switch 1st Off Time | 00:00-24:00 | 22:00 | 22:00 | 22:00 |
| 8 | Heating Time Switch 2nd On Time | 00:00-24:00 | - | - | - |
| 9 | Heating Time Switch 2nd Off Time | 00:00-24:00 | - | - | - |
| 10 | Heating Time Switch 3rd On Time | 00:00-24:00 | - | - | - |
| 11 | Heating Time Switch 3rd Off Time | 00:00-24:00 | - | - | - |
| 13 | Required HWS Temperature | 40-60 | 55 | 55 | 55 |
| 14 | Heating Night Setback Temperature | 10-30 | 16 | 16 | 16 |
| 15 | Frost Protect Temperature | 4-15 | 10 | 10 | 10 |
| 16 | Summer/Winter Changeover Temperature | 8-30 | 30 | 30 | 30 |
| 17 | Weather Compensation Curve. If a 0-10 volt signal is the required heat generation control method for the RVA47 / boiler installation this setting must be adjusted to -- on all RVA47s present in the boiler cascade installation. This will result in the Auto, On/Off and Frost lights becoming inactive. Alteration to parameter #170 and #172 will also be required. | 0-40 | 32 | 32 | 32 |
| 18 | Actual Room Temperature | 0-50 | -- | -- | -- |
| 19 | Actual Outside Temperature (Pressing the + & - buttons simultaneously until the display stops flashing will reset the averaged value.) | -50+50 | -- | -- | -- |
| 23 | Restore User Level Factory Presets | 0-1 | 0 | 0 | 0 |
| 30 | Hot Water Time Switch 1st On Time | 00:00-24:00 | 06:00 | 06:00 | 06:00 |
| 31 | Hot Water Time Switch 1st Off Time | 00:00-24:00 | 22:00 | 22:00 | 22:00 |
| 32 | Hot Water Time Switch 2nd On Time | 00:00-24:00 | - | - | - |
| 33 | Hot Water Time Switch 2nd Off Time | 00:00-24:00 | - | - | - |
| 34 | Hot Water Time Switch 3rd On Time | 00:00-24:00 | - | - | - |

| [#] | Description | Range | Wall Mounted | HT 150 & 225 Standalone | HT 150 & 225 Master Cascade |
|-----|--|-------------|--------------|-------------------------|-----------------------------|
| 35 | Hot Water Time Switch 3rd Off Time | 00:00-24:00 | - | - | - |
| 50 | Fault Code Display | 0-255 | -- | -- | -- |
| | Engineer Level | | | | |
| 51 | Output Test 0. Automatic control 1. All outputs off 2. HWS pump/valve on 3. Circulating pump on | 0-3 | 0 | 0 | 0 |
| 52 | Input Test 0. Return Temperature 1. HWS Temperature 2. Flow Temperature 3. Outside Temperature 4. Room Temperature 5. 0-10 Volt Required Temperature | 0-5 | 0 | 0 | 0 |
| 53 | Plant Type | 0-100 | -- | -- | -- |
| 56 | Actual System Flow Temperature | 0-140 | -- | -- | -- |
| 57 | Actual System Return Temperature | 0-140 | -- | -- | -- |
| 59 | Actual System HWS Temperature | 0-140 | -- | -- | -- |
| 60 | Attenuated Outside Air Temperature | -50-+50 | -- | -- | -- |
| 61 | Composite Outside Air Temperature | -50-+50 | -- | -- | -- |
| 62 | Outside Air Temperature Source | 00.01/14.16 | -- | -- | -- |
| 66 | Maximum System Flow Temperature | 8-85 | -- | -- | -- |
| 69 | Maximum HWS Temperature | 8-85 | -- | -- | -- |
| 70 | Nominal Room Temperature Set Point | 0.0-35.0 | -- | -- | -- |
| 71 | Set Point Of Room Temperature | 0.0-35.0 | -- | -- | -- |
| 72 | System Flow Temperature Set Point | 0-140 | -- | -- | -- |
| 75 | Modules Available in Cascade | 00.1/16.3 | -- | -- | -- |
| 76 | Lead Module in Cascade | 00.1/16.3 | -- | -- | -- |
| 77 | Hour of Operation Until Sequence Change | 0.990 | -- | -- | -- |
| 95 | Heating Pump Output (HKP) Output Functions | 1-5 | 1 | 1 | 1 |
| 100 | Displacement Of Weather Compensation Curve | -4.5 - +4.5 | 0 | 0 | 0 |
| 101 | Gain Factor/Room Influence 0. Inactive 1. Active | 0-1 | 0 | 0 | 0 |
| 102 | Room Temperature Switching Differential | ---/0.5-4 | --- | --- | --- |
| 103 | Minimum System Flow Temperature | 8-95 | 8 | 8 | 8 |
| 104 | Maximum System Flow Temperature | 8-95 | 82 | 82 | 82 |
| 105 | Building Construction Type 0. Heavy 1. Light | 0-1 | 1 | 1 | 1 |
| 106 | Adaptation of Heat Curve 0. Inactive 1. Active | 0-1 | 0 | 0 | 0 |
| 107 | Optimum Start Time Maximum Forward Shift. 00:00 Inactive | 00:00-06:00 | 00:00 | 00:00 | 00:00 |
| 108 | Optimum Stop Time Maximum Forward Shift 00:00 Inactive | 00:00-06:00 | 00:00 | 00:00 | 00:00 |
| 109 | Heating Zone Quick Setback Constant | 0-20 | 2 | 2 | 2 |
| 110 | Over Heat Protection Heating Zone Pump | 0-1 | 0 | 0 | 0 |
| 117 | Legionella Protection Function 0. Off. 1. On | 0-1 | 0 | 0 | 0 |
| 118 | Legionelle Protection Temperature | 8-95 | 65 | 65 | 65 |
| 119 | HWS Pump Operation Function. (Stored > Flow Temp) 0. Off 1. Always On 2. Only On When Boiler is Interlocked Off Via 170=3 | 0-2 | 0 | 0 | 0 |
| 120 | Reduced HWS Temperature Set Point | 8-70 | 40 | 40 | 40 |
| 121 | HWS Time Control 0. 24 Hours per Day 1. As Heating Time Switch Settings 2. As HWS Time Switch Settings | 0-2 | 2 | 2 | 2 |
| 122 | HWS Pump Control 0. Heating Time Switch Setting Apply 1. HWS Time Switch Settings Apply | 0-1 | 1 | 1 | 1 |

| [#] | Description | Range | Wall Mounted | HT 150 & 225 Standalone | HT 150 & 225 Master Cascade |
|-----|---|------------|--------------|-------------------------|-----------------------------|
| 123 | HWS Control in Cascade System 0. Controlled Via Master RVA47 Manager 1. Controlled Via All RVA47 Managers in Segment 2. Controlled Via All RVA47 Managers In LPB System | 0-2 | 2 | 2 | 2 |
| 124 | HWS Charging Cycles Per 24 Hour Period 0. One Per Day with 2.5 Hour Forward Shift from Heating Time Switch Setting 1. Several Per Day with 1 Hour Forwarding Shifting from Heating Time Switch Setting | 0-1 | 1 | 1 | 1 |
| 125 | HWS Temperature Control 0. QAZ21 Sensor 1. Volt Free Enable via Thermostat | 0-1 | 0 | 0 | 0 |
| 126 | System Flow Temperature Boost When HWS Enabled | 0-30 | 20 | 20 | 20 |
| 127 | HWS Priority / Shifting 0. Absolute Priority 1. Shifting Priority. Heating Reduced to Increase HWS Recovery 2. No Priority. HWS and Heating Operate in parallel 3. Shifting / Absolute Heating Switched OFF, Mixing Circuit Decreased (RVA46) to Increase HWS Recovery. | 0-3 | 1 | 1 | 1 |
| 130 | Hours Of Operation Prior to Sequence Rotation | 10-990 | 100 | 10 | 10 |
| 131 | Changeover Sequence Program 0. No Exemptions 1. The First Module is Exempt 2. The Last Module is Exempt 3. The First and Last Modules are Exempt | 0-3 | 0 | 0 | 0 |
| 132 | Module Designated as Fixed Lead Unit | 00.1-16.3 | --- | --- | --- |
| 133 | Cascade Enable Delay Time | 1-120 | 2 | 1 | 1 |
| 134 | Anti Cycling Time (Seconds) | 0-1800 | 180 | 30 | 30 |
| 140 | LPB Control Address 0. Single RVA47 Manager (No boilers connected) 1. Master RVA47 Manager (LPB Boilers connected) 2....16. Slave RVA47s Operating From Master RVA47 Manager | 0-16 | 1 | 1 | 1 |
| 141 | LPB Control Segment 0. Heat Generating Units (RVA47s) 1...14. Heat Consuming Units (RVA46s) | 0-14 | 0 | 0 | 0 |
| 142 | LPB Power Supply 0. Off 1. On | 0-1 | 1 | 1 | 1 |
| 143 | Operation of LPB Power Supply | On/Off | On | On | On |
| 144 | Display of LPB Communication | On/Off | On | On | On |
| 145 | Changeover Via LPB Connection 0. All Controllers in Same Segment 1. All Controllers in LPB System | 0-1 | 1 | 1 | 1 |
| 146 | Summer/Winter Changeover Via LPB 0. Local Control Only 1. Entire Control Via LPB | 0-1 | 0 | 0 | 0 |
| 147 | Central Standby Switching 0. Deactivated 1. Activated | 0-1 | 0 | 0 | 0 |
| 148 | Clock Mode 0. Autonomous All Clocks Can Have Different Times 1. System Time Without Adjustment 2. System Time With Adjustment 3. System Clock Master. There Can Only be One Master | 0-3 | 2 | 2 | 2 |
| 149 | Auto Time Adjustment Spring Date and Month of Last Sunday in March | Date/Month | 25.03 | 25.03 | 25.03 |
| 150 | Auto Time Adjustment Autumn Date and Month of Last Sunday in October | Date/Month | 25.10 | 25.10 | 25.10 |
| | | | | | |

| [#] | Description | Range | Wall Mounted | HT 150 & 225 Standalone | HT 150 & 225 Master Cascade |
|-----|--|-------|--------------|-------------------------|-----------------------------|
| 170 | <p>Operation of H1 Terminal</p> <p>0. Changeover of Operation When Volt Free Switch is Made. (HWS Stopped)</p> <p>1. Changeover of Operation When Volt Free Switch is Made. (HWS Unaffected)</p> <p>2. Minimum Flow Temperature Maintained When Volt Free Switch is Made. (Set at 171.)</p> <p>3. Heat Generation Stopped When Volt Free Switch is Made.(Frost Active)</p> <p>4. 0-10 Volt Control to Vary System Flow Temperature. (Curve set at 172)</p> <p>(Terminal #1. 0-10 volt. Terminal #2. Ground.)</p> <p>{If a 0-10 volt signal is the required heat generation control method for the RVA47 / boiler installation this setting must be adjusted to 4. Alterations must also be made to parameter #17. The setting must be adjusted from 32 to – on all RVA47s present in the boiler cascade installation. This will result in the Auto, On/Off and Frost lights becoming inactive. Possible alterations to parameter #172 may also be required.}</p> | 0-4 | 0 | 0 | 0 |
| 171 | Minimum Temperature Set Point Via H1 (170 = 2) | 8-95 | 80 | 80 | 80 |
| 172 | Maximum Temperature Set Point Via H1 (170 = 4) | 5-130 | 82 | 82 | 82 |
| 173 | <p>Operating Action of H1 control contacts.</p> <p>0. The contact is Normally Closed.</p> <p>1. The contact is Normally Open.</p> <p>{The RVA47 will operate according to its internal time switches and presets.</p> <p>If a remote BMS is controlling the RVA47 via a Volt Free switch across H1 '0' should be inserted.</p> <p>This will allow the boilers operate when the Volt Free switch is made and stopped (Blocked.) when the switch is opened.</p> <p>If you are controlling the lead (master) RVA/Boiler via a volt free switch across H1, all slave modules should be left with '1' as the input.</p> <p>This will allow the AUTO light and the OFF light to indicate their operational mode dictated by the lead (master) RVA/Boiler.}</p> | 0-1 | 1 | 1 | 1 |
| | OEM Level (DD+--) | | | | |
| 2 | Maximum Module Temperature When Operating In Manual Mode | 8-120 | 82 | 82 | 82 |
| 8 | Pump Run On Time System Heating (HKP) and HWS (SLP) Pumps | 0-20 | 5 | 3 | 3 |
| 22 | Minimum System Return Temperature | 8-95 | 8 | 8 | 8 |
| 30 | Room Influence Gain Factor | 0-20 | 4 | 4 | 4 |
| 32 | Boost Room Temperature Set Point Room Sensor Dependant (QAA10/50/70) Increase. Heat Up Time Reduced Decrease Heat Up Time Increased | 0-20 | 5 | 5 | 5 |
| 33 | Frost Protection 0. Frost Protection Program Disabled 1. Frost Protection Program Enabled | 0-1 | 1 | 1 | 1 |
| 35 | Heat Gains Increase. If Heat Gains are High Decrease. If Heat Gains are Low | -2-+4 | 0 | 0 | 0 |
| 36 | Adaptation Sensitivity 1 Outside Air Range 4-12C | 1-15 | 15 | 15 | 15 |
| 37 | Adaptation Sensitivity 2 Outside Air Range <4C | 1-15 | 15 | 15 | 15 |
| 40 | Maximum HWS Set Point | 8-80 | 60 | 60 | 60 |
| 41 | HWS Switching Differential (QAZ21 Sensor Only) | 0-20 | 5 | 5 | 5 |

| [#] | Description | Range | Wall Mounted | HT 150 & 225 Standalone | HT 150 & 225 Master Cascade |
|-----|---|-----------|--------------|-------------------------|-----------------------------|
| 42 | Legionella Function 0. Off 1. On. | 0-1 | 0 | 0 | 0 |
| 50 | Cascade Strategy 1-3 Automatic 4-6. Fixed | 1-6 | 2 | 3 | 3 |
| 51 | Minimum % Output reached Prior to Switching Off a Module In the Cascade | 5-100 | 40 | 20 | 20 |
| 52 | Maximum % Output Reached Prior to Switching On a Module In The Cascade | 5-100 | 80 | 85 | 85 |
| 56 | Time Spent By Module On Ignition Rate Prior to Modulation (Delay Time Between Modules) | 0-1200 | 0 | 0 | 0 |
| 60 | Minimum Temperature Difference Between Flow/Return Sensor Readings Prior to The Return Sensor Becoming Lead | 0-20 | 2 | 2 | 2 |
| 90 | Display Default 0. Time of Day 1. System Flow Temperature (CA) | | 0 | 1 | 1 |
| 91 | Software Version | 00.0-99.9 | # | # | # |
| 92 | RVA47 Manager Operating Hours | 0-500,000 | -- | -- | -- |

Weather Compensation Curve Graph

