

SOFTWARE FUNCTION & VERIFICATION

2V164 G UMX

VOLTAGE REGULATION & CONTROL RELAY



| Issue | Date | Summary of changes |
|-------|------------|---|
| A | 24/03/2003 | Initial issue. |
| B | 29/04/2003 | Correct undervoltage alarm and blocking set points. |
| | | |
| | | |

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| Author | Checked & Registered | .pdf file created | Released |
|--------|----------------------|-------------------|----------|
| ARF | DG | DG | |

3.0 DESCRIPTION – UMX2V164G.UMX

3.1 Standard Features

The 2V164 provides a range of standard features as described in the RMS Technical Bulletin which may be downloaded from:

www.rmspl.com.au/handbook/2v164.pdf

3.11 Voltage Section

| | |
|--------------------------------------|-----------------------------|
| Set point Voltage Range | 90 - 130 in 0.25VAC Steps |
| Bandwidth Setting | 0.5 - 5.0 in 0.25 VAC Steps |
| Coarse Bandwidth | 1 - 20 in 1.0 VAC Steps |
| Over Voltage Setting Range | 110 - 130 in 1.0 VAC Steps |
| Under Voltage Blocking Setting Range | 60 - 110 in 1.0 VAC Steps |
| Under Voltage Alarm Setting Range | 60 - 110 in 1.0VAC Steps |
| Hysteresis | 50% |

3.12 LDC

| | |
|-------------------------|-----------------------------|
| Current | 1.0 or 5.0 Amp AC |
| <u>Group 1 Settings</u> | |
| Resistance | 0 - 20 VAC in 0.1 VAC Steps |
| Reactance | 0 - 20 VAC in 0.1 VAC Steps |
| <u>Group 1 Settings</u> | |
| Resistance | 0 - 20 VAC in 0.1 VAC Steps |
| Reactance | 0 - 20 VAC in 0.1 VAC Steps |

3.13 Timer Section

| | |
|--------------------------------------|----------------------------|
| Accuracy all timers | +/- 0.1 Seconds |
| Initial Time Delay | 10 - 300 in 10second steps |
| Interval Time Delay | 1 - 100 in 1second steps |
| Over Voltage Setting Range | 1 - 60 in 1second steps |
| Under Voltage Alarm Setting Range | 1 - 60 in 1 second steps |
| Under Voltage Blocking Setting Range | 0 - 60 in 1second steps |
| Coarse Bandwidth | 0 - 60 in 1second steps |
| Tap Change Fail | 10 - 300 in 10second steps |
| Timing Characteristic | Definite or Inverse |
| Tap Change Output Pulse | 1-325s in 1s steps |

3.14 Load Step Inputs

| | |
|--------------------|----------------------------|
| 2 Load Step Inputs | -10% to -10% in 0.5% steps |
|--------------------|----------------------------|

3.2 Special Features of the 'G' Software UMX Version

3.2.1 TPI feedback mode

When a tap raise or lower command is output by the 2V164 to the OLTC, the internal tap change fail timer is started. Feedback from the OLTC is required to reset this timer. One of three methods may be used depending on the requirements of the control system. The G UMX utilises the 'OLTC AUTO Method'. *For information on the two other methods, see the 2V164 data sheet or the UMX2V164A & UMX2V164C documents.*

UMX2V164G A VOLTAGE MONITORING (Automatic mode)

In this mode the 2V164 provides an adjustable output pulse length (1-325s in 1s steps), to initiate a tap raise or lower event. This output pulse is then repeated at a rate set by the Interval Timer setting until the voltage deviation falls back within the bandwidth limit. This is the simplest method as it does not require a hard-wired contact between the OLTC & the VRR.

3.2.2 Undervoltage Blocking

An undervoltage blocking function (60-110V) is combined with a definite time delay (0-60s). Undervoltage blocking suppresses tap change operations during a system breakdown to avoid the tap changer mechanism from being driven to the top tap.

The G UMX does not have an output contact associated with the Under Voltage Blocking function.

In under voltage blocking the message **** U/V BLOCKED **** is displayed on the HMI.

3.2.3 Undervoltage Alarm Output

The Over Current Blocking function available on the A, B and C UMX versions has been replaced on the G version with an Under Voltage Alarm function (60-110V). Unlike the Under Voltage Blocking function, this function has a self reset alarm contact output and does not block tap change commands. A front panel U/V Alarm LED flashes during timing & goes solid when the times out.

3.2.4 Alternate LDC Setting Group

An alternate group (LDC 2) for LDC resistance and reactance settings may be entered into the LDC menu with this UMX. Status Input 5 (SI5 on the wiring diagram), is used to toggle between the LDC setting groups.

When the LDC 2 Group is selected output contact 7 will pick up to signal this operational mode.

When an LDC mode is selected (Other than OFF), the message:

**** LDC Group 1 ** or ** LDC Group 2 **** is displayed on the HMI as determined by the SI5 input status.

3.2.5 CT Ratio Selection Options

Selections available include: 1.8KA, 3.5KA, 3.6KA.

3.2.6 LDC Calibration

For this model the LDC calibration is carried out using the 5A CT input connection.

4.0 USER INTERFACE

Refer to the μ MATRIX Users Guide for detailed instructions on the operation of the user interface.

To download a PDF version of the guide:
www.rmspl.com.au/digital/uMATRIXInfo.pdf

To download further μ MATRIX software & documentation:
www.rmspl.com.au/uMATRIX.htm

5.0 Loading software, Calibration & Test

This section requires at least the following:
A PC with Windows 98 or later and at least one COM port.
UMatrixWin software.
The correct serial cable.
The ability to interrogate the relay via the front panel buttons.
A general understanding of how UMX and UMP files work with the relay.

Settable parameters will be overwritten by loading a new UMX file. They can however, be saved to a UMP file and then returned to the relay later. To learn how to do this, refer to the uMatrix Userguide.

5.1 Loading the UMX

Before loading the UMX2V164G software, ensure that it is compatible with your hardware.
Download the compatibility list from the RMS website at:

www.rmspl.com.au/digital/compatibility.pdf

Now ensure that the bios version in the relay matches the table in section 2.0 of this document.
(If the bios version is different, you may not be able to load this UMX. Contact RMS for support.)

Load the UMX via the front panel COM port using the 'uMatrixWin' software. Now ensure that the UMX version matches the table in section 2.0.

To interrogate for versions, press 'SET' and 'DATA' buttons simultaneously, then select 'Version Page'. Alternatively, use uMatrixWin – Options – Utilities.

Check versions

The relay is now ready to calibrate. *Note: calibration is a factory function. If you are simply changing or re-loading a UMX, re-calibration is not necessary. The relay is deemed to be fully operational.*



5.2 Calibration using 'WinCal'

Test equipment required:

As 5.0 plus

Calibrated Test Set (Volts, Amps, Timing & Phase Angle)

- a) With the test set and PC connected to the relay, start Wincal, select uMatrix – Connect.
- b) Select uMatrix – Calibrate and follow the prompts. When completed, verify the following parameters.
- c) Check Voltage display reading accuracy:

| MINIMUM | MAXIMUM | NOMINAL | ACTUAL | UNITS |
|---------|---------|---------|----------------------|-------|
| 119.8 | 120.2 | 120.0 | <input type="text"/> | VDC |
| MINIMUM | MAXIMUM | NOMINAL | ACTUAL | UNITS |
| 109.8 | 110.2 | 110.0 | <input type="text"/> | VDC |
| MINIMUM | MAXIMUM | NOMINAL | ACTUAL | UNITS |
| 99.8 | 100.2 | 100.0 | <input type="text"/> | VDC |

- d) Check current display reading accuracy:

| MINIMUM | MAXIMUM | NOMINAL | ACTUAL | UNITS |
|---------|---------|---------|----------------------|-------|
| 0.19 | 0.21 | 0.20 | <input type="text"/> | Amps |
| MINIMUM | MAXIMUM | NOMINAL | ACTUAL | UNITS |
| 0.49 | 0.51 | 0.50 | <input type="text"/> | Amps |
| MINIMUM | MAXIMUM | NOMINAL | ACTUAL | UNITS |
| 0.99 | 1.01 | 1.00 | <input type="text"/> | Amps |

5.3 Optional Analogue Output Verification

Does not exist in all hardware variants.

- a) With the Line voltage set to 110V there should be 16.1+/-0.1mA between terminals 49 and 51.

VERIFY

- b) With the TPI set for 1 there should be 4.7 +/-0.1mA between terminals 53 and 55 and with the TPI set to 30 there should be 20.0 +/-0.1mA between terminals 53 and 55.

VERIFY

If the relay settings in the above are correct, the relay is deemed to be fully operational.

TESTED BY : _____ DATE : _____

6.0 CONNECTION DIAGRAM

