



### APPLICATION NOTE

- 2 Configurable Analog Channels
- 10 Pre-configured Inputs and Outputs for Stop Start Control
- Licence Free Radio Link
- ISaGRAF 61131-3 Programmable
- Touch Screen (operator Interface terminal) - Optional
- SD Card Logging - Optional
- Low power operation
- 10/100 Ethernet



#### Features

- Low Power operation
- 12 Inputs and/or Outputs (Analog or Digital)
- 9 - 30V dc powered.
- SD Memory Card Slot for off-line data logging.
- On-board temperature sensor and voltage monitor
- Integral Real-Time Clock with Battery Backup
- Programmable for a wide range of applications.
- Wide operating temperature range
- Compact size for tight spaces
- Convenient DIN Rail mounting

#### Overview

The TELETERM M3 series is a state-of-the-art RTU range with Ethernet designed to expand the possibilities of remote monitoring and control by providing a cost effective platform with a wide range of features.

Other communications options include GSM, 3G UMTS (NextG Australia), CDMA and licence-free Radio in a number frequency bands. Conet Industrial LAN is standard for use over existing plant cabling, and RS232 and RS485 serial.

The standard TELETERM M3 comes with 12 universal I/O that can be configured for analogue or digital input or output according to your needs. However, in this configuration, the basic Stop Start configured system comprises two Teleterm M3 RTUs; one at the (local) remote control end with all the I/O dedicated to control inputs and pump feedback statuses as compared to the pump (remote) side with all the I/O dedicated to control outputs and pump feedback inputs. The I/O at the remote control (local) side comprises 2 Potential Free contact inputs and at the Pump (remote) end, two 10Amp relay contacts. Two Potential Free contact inputs also on the pump side provide feedback to the remote control side. Refer to specifications for more details. on I/O mapping.

The on board RS232/485 port can be used to acquire data from other third party devices using either the Modbus protocol, or by

downloading a custom software protocol "plug-in". This feature allows a wide variety of third party devices to be supported.

The low power consumption of the Teleterm M3 makes it suitable for use in solar powered and battery powered applications.

Typical applications for the M3 include:

- Energy Management and Remote Meter Reading.
- Environmental Monitoring
- Remote Site Monitoring
- Utilities monitoring
- Remote inventory monitoring
- Traffic Management
- Remote Digital Advertising Sign management
- Transport/Cargo Monitoring
- Vending machines

Stay in touch – Take control  
with the Teleterm M3 Series  
from Omniflex.

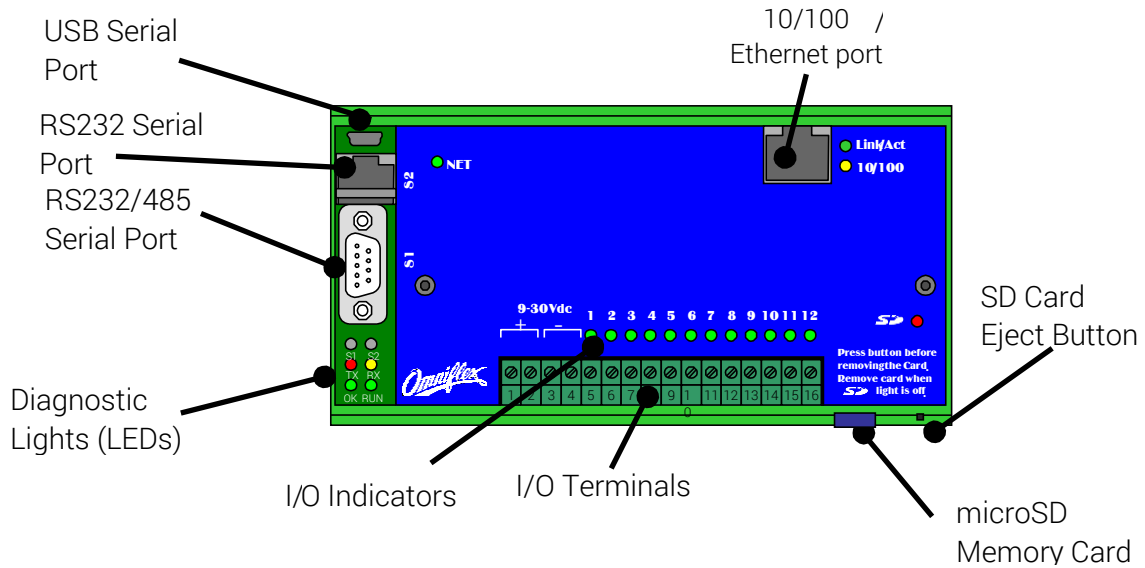




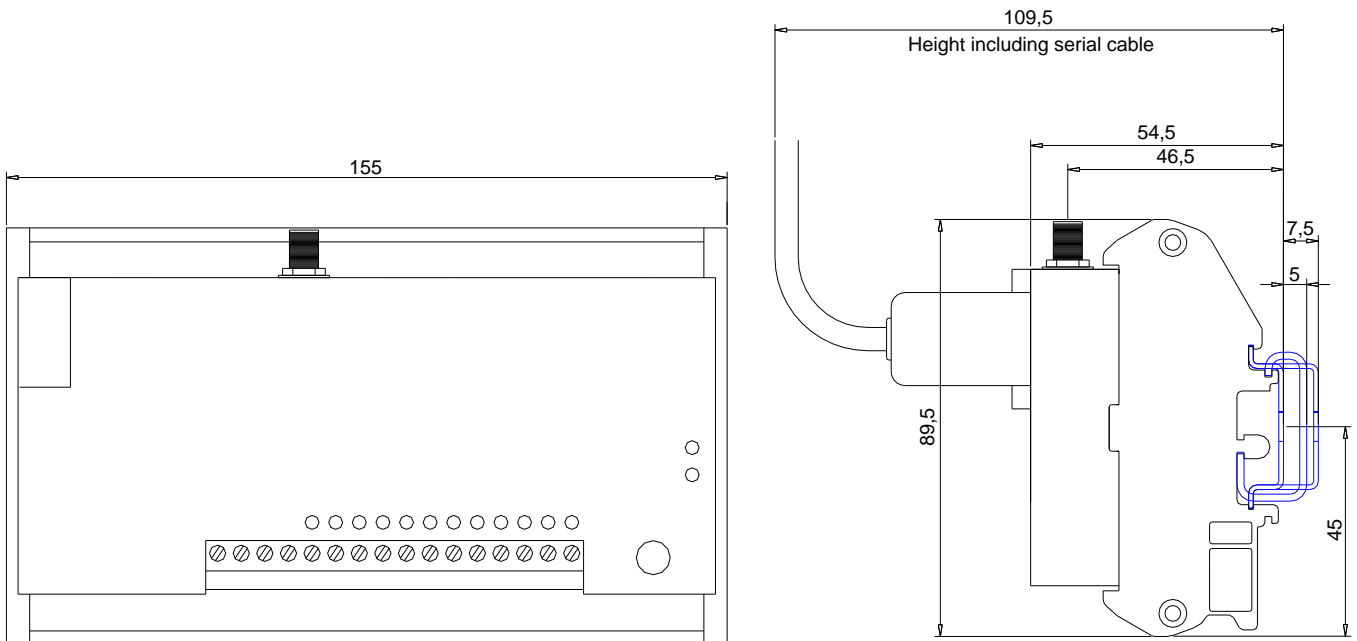
# TELETERM M3 Series Programmable RTU's

Stop Start Control RTU

## General Layout



## Mechanical Dimensions





### Communication Functions by Model

Product Name	Order Code	Notes	12 I/O	10/100 Ethernet	RS232 Port	RS232/RS485 Port	2.4GHz 63mW Radio Port	868MHz 315mW Radio Port	920MHz 1W Radio Port
M3R1e	C2363A-31	2,3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
M3R3e	C2362A-33	1,4	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
M3R4e	C2362A-34	1,3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
M3Se	C2363A-41		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			

#### NOTES:

1. The M3R version is available in a number radio band options to comply with different country regulations. Please ensure that the correct unit is specified for your application.
2. 2.4GHz Band is suitable for use all countries.
3. 920MHz Band is suitable for use in USA, Australia and New Zealand.
4. 868MHz Band is suitable for use in Europe, and South Africa.

### Input/Output Configurable Options

The Logger is equipped with 12 versatile input/output points (I/O points or IOP's). Each I/O point can be individually configured from the options given in the following table:

I/O Point	Terminal No.	Digital Input	Analogue Input	Digital Output	Analogue Output
1	5	Yes	0-30Vdc	Yes	-
2	6	Yes	0-30Vdc	Yes	-
3	7	Yes	0-5Vdc	Yes	-
4	8	Yes	0-5Vdc	Yes	-
5	9	Yes	0-5Vdc	Yes	-
6	10	Yes	0-5Vdc	Yes	-
7	11	Yes	0-5Vdc	Yes	-
8	12	Yes	0-5Vdc	Yes	-
9	13	Yes	0-5Vdc	Yes	-
10	14	Yes	0-5Vdc	Yes	-
11	15	Yes	0-30Vdc	-	0/4-20mA
12	16	Yes	0-30Vdc	-	0/4-20mA

**Note 1:** See the "Specifications" section of this document for detailed specifications of each I/O point option.

**Note 2:** All 0-30V analogue inputs have increased resolution over the range 0-6V (equivalent to the 0-5V inputs).

**Note 3:** All Digital Inputs can be configured as Pulse Counters or Hours Counter.

**Note 4:** All Digital Outputs can be configured as Pulse outputs (normally ON or normally OFF).

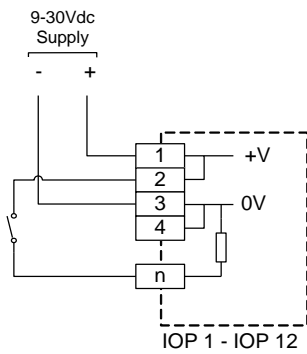


# TELETERM M3 Series Programmable RTU's

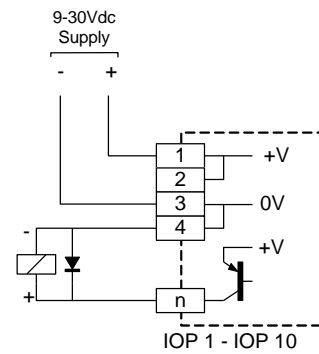
## Stop Start Control RTU

Configuration for Basic Stop Start Control Application in wall mount panel. \*Other Configurations on request

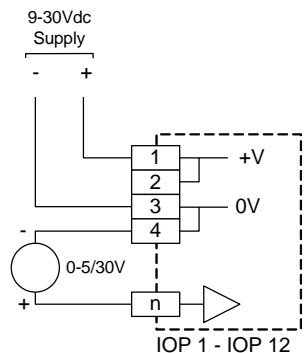
Remote Control Side (Local)			Pump Control Side (Remote)		
I/O Point	Terminal No.	I/O Type	I/O Point	Terminal No.	I/O Type
1	5	Control Input Ext Switch Pot Free	1	5	Control Output Via 10A Relay Contact
2	6	Control Input Ext Switch Pot Free	2	6	Control Output Via 10A Relay Contact -
3	7	Feedback Output Lamp	3	7	Feedback Contact Potential Free Contact Req'd
4	8	Feedback Output Lamp	4	8	Feedback Contact Potential Free Contact Req'd
5	9	Feedback Output Via 10A Relay Contact	5	9	Feedback Contact Potential Free Contact Req'd
6	10	Feedback Output Via 10A Relay Contact	6	10	Feedback Contact Potential Free Contact Req'd
7	11	Spare Input	7	11	Spare Output Open Collector
8	12	Spare Input	8	12	Spare Output Open Collector
9	13	Spare Output Open Collector	9	13	Spare Input
10	14	Comms Link Ok Lamp	10	14	Comms Link Ok Lamp
11	15	Optional Analogue Input 0-5Vdc	11	15	Optional Analogue Output 0/4-20mA
12	16	Optional Analogue Output 0/4-20mA	12	16	Optional Analogue Input 0-5Vdc



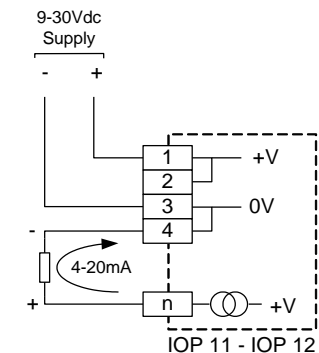
DIGITAL INPUTS



DIGITAL OUTPUTS



ANALOGUE INPUTS



ANALOGUE OUTPUTS





### Specifications Common To All Models

#### Input/Outputs

All M3 RTU's have 12 Input/Output Points (IOP configurable in software as analogue or digital, inputs or outputs.)  
(See the table above for a matrix of available functions on each I/O Point.)

##### As a Digital Input (I/O Points 1 to 12)

Type	Current Sink (Switch to +V to operate)
Input Impedance	5 kOhms nominal.
Input OFF Condition	Input < 2Vdc
Input ON Condition	Input > 3Vdc
Functions	Software selectable as: ON/OFF Input Counter Input (counts rising edge pulses) Hours Input (counts hours while input is on to resolution of 0.01 hours).

##### As a Digital Output (I/O Points 1 to 10)

Type	Voltage Source (Solid State Switch to +V)
ON State Rated Current	< 100mA continuous maximum per output < 200mA peak (<10ms) max, per output < 500mA total for all outputs simultaneously
ON State Volt Drop	< 3V at maximum rated load
OFF State Rated Leakage Current	< 0.1mA at maximum supply voltage
Functions	Software selectable as: ON/OFF ON Pulse (configurable 10ms – 300s) OFF Pulse (configurable 10ms – 300s)

##### As an Analogue Input (I/O Points 1,2, 11, 12)

Type	Voltage Input referenced to 0V supply.
Range	0-30Vdc (software configurable to smaller ranges such as 1-5Volts)
Accuracy	< 0.15% of reading +6mV from 0 to 5.5V < 0.15% of reading +30mV from 5.5 to 30V
Resolution	6mV from 0 to 5.5 Volts nominal (10 bits) 33mV from 5.5 to 30Volts nominal (10 bits)

##### As an Analogue Input (I/O Points 3 to 10)

Type	Voltage Input referenced to 0V supply.
Range	0-5.5Vdc (software configurable to smaller ranges such as 1-5Volts)
Accuracy	< 0.25% of reading +6mV
Resolution	6mV nominal (10 bits)

##### As an Analogue Output (I/O Points 11 and 12)

Type	4-20mA Source into 0V connected load
Load	Calculate maximum load as follows: $R_{max} = (V_{supply} - 5V) \div .02 \text{ Ohms}$ Examples: 11V Supply: $R_{max} = 300 \text{ Ohms}$ 13.8V Supply: $R_{max} = 440 \text{ Ohms}$ 22V Supply: $R_{max} = 300 \text{ Ohms}$ 24V Supply: $R_{max} = 950 \text{ Ohms}$ 27.6V Supply: $R_{max} = 1130 \text{ Ohms}$
Maximum Range	0 to 23 mA (software configurable to smaller ranges such as 4-20mA or 0-10mA)
Accuracy	< 0.25% of full scale

#### General Specifications

##### Power Requirements

Power Supply Voltage	9 – 30Vdc (ripple < 5%)
Average Current	80mA at 12Vdc    40mA at 24Vdc

##### IEC61131-3 Programming (Optional)

Six graphical Languages	SFC – Structured Flow Chart FC – Flow Chart FBD – Function Block LD – Ladder Diagram ST – Structured Text IL – Instruction List
Programming Environment	Windows PC based "Omniflex ISaGRAF Application Workbench"

##### Environmental Conditions

Storage Temperature	-25°C – 85 °C (-13°F – 185°F)
Operating Temperature	-10°C – 60 °C (+14°F – 140°F)
M3G Radio compliance	-10°C – 50 °C (+14°F – 122°F)

##### Weight

Packed/Unpacked	350gm/250gm approx.
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##### Processor

Type	Dual Core 16 Bit Processor
Clock Speed	72MHz
Memory – Flash / RAM	1MB / 512kB

##### Real Time Clock

Resolution	10ms
Accuracy	1 min per month
Battery Life	> 1 year with power off > 5 years with power on.
Battery Type	3V Lithium Cell type CR2032

##### Compliance with Standards

Safety	EN 60950
Emissions	EN 55011, Group I, Class A
Immunity – ESD	IEC 61000-4-2:2001, level 3
Immunity – RF Fields	IEC 61000-4-3:2003, level 3
Immunity – Fast Transients	IEC 61000-4-4:2004 2 kV – DC power port 1 kV – input/output lines



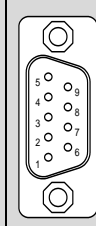


# TELETERM M3 Series Programmable RTU's

## Stop Start Control RTU

### Front Serial port ( available on all models )

Type	Asynchronous serial port
Protocols	Supports the following protocols as standard: <ul style="list-style-type: none"> <li>• Conet/s</li> <li>• Modbus ASCII (Master or Slave)</li> <li>• Modbus RTU (Master or Slave).</li> </ul>
Baud Rate	300 – 38,400 baud.
Maximum cable length	15 meters (50ft) in RS232 mode 1200m (4000ft) in RS485 mode
Connection	9 pin sub-miniature DB9 (male).
RS232/422/485	Selected by the wiring to the DB9 connector



Pin	Communication Standard	
	RS232	RS485
1	Do not connect	Rx Data + (In)
2	Rx Data (In)	Rx Data – (In)
3	Tx Data (Out)	Do not connect
4	Do not connect	Tx Data+ (Out)
5	Ground	Ground
6	Do not connect	Vcc
7	RTS (Out)	Do not connect
8	CTS (In)	Do not connect
9	Do not connect	Tx Data – (Out)

### Plug-in Memory Card ( available on all models )

Type	Standard SD Memory Card (24mm x 32mm x 1.4mm)
Storage Capacity	SD Memory Card dependent: Up to 2Gb supported
Card Format	PC Compatible FAT File Format

Data Format	Data writable by program to suit application. Any text based file format may be written such as CSV File Format compatible with Microsoft Excel etc.
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### Ethernet Port ( available on all models )

<b>Network Port</b>	
Type	10/100 UTP Ethernet
<b>Specifications</b>	
Network Protocol Support	UDP/IP and TCP/IP

Protocols	Modbus/TCP Class 0 Conet/e for remote programming and network routing.
IP Addressing	Fixed IP set during configuration.

### Network Communications Specifications for the Teleterm M3R1(e) C2363A-31 (2.4GHz 63mW)

Operating Band	ISM 2.4Ghz
Special Radio Licence Requirements	None. (operates in licence-free ISM band)
Transmit Power	63mW (+18dBm)
Receiver Sensitivity	-100dBm typical
Modulation	DSSS FSK

RF Data Rate	250,000 bits per second
Serial Data Rate	9,600 bits per second
Indoor/Urban Range	90m
Outdoor (LOS)	1 km
Antenna	RPSMA Connector for external antenna
Approvals	Approved for use internationally

### Network Communications Specifications for the Teleterm M3R3(e) C2363A-33 (868MHz 315mW)

Operating Band	SRD g3 Band (869.525 MHz)
Special Radio Licence Requirements	None. (operates in licence-free ISM band)
Transmit Power	315mW (+25dBm)
Receiver Sensitivity	-112dBm typical
Modulation	FSK

Throughput Data Rate	2,400 bits per second 10% duty cycle
Number of Channels	Single Channel
Outdoor Range (Line of Sight)	Up to 20 km with dipole Up to 40 km with hi-gain antenna
Antenna	RPSMA Connector for external antenna
Approvals	Approved for use in Europe and S.Africa





# TELETERM M3 Series Programmable RTU's

Stop Start Control RTU

## Network Communications Specifications for the Teleterm M3R4(e) Model C2363A-34 (920MHz 1W)

Operating Band	915-928 MHz	Throughput Data Rate	9,600 bits per second
Special Radio Licence Requirements	None. (operates in licence-free ISM band)	Number of Channels	10 Frequency Hopping Sequences
Transmit Power	Settable 1mW (0dBm) to 1W(+30dBm)	Outdoor Range (Line of Sight)	Up to 10 km with dipole Up to 30 km with hi-gain antenna
Receiver Sensitivity	-110dBm typical	Antenna	RPSMA Connector for external antenna
Modulation	FHSS FSK	Approvals	Approved for use in USA and Australia

## Ordering Information

ORDER CODE	PRODUCT	DESCRIPTION
C2363A-31 – x	Teleterm M3R1e	Teleterm M3Re Programmable RTU equipped with 10/100 Ethernet Port and integral 2.4GHz 50mW FHSS licence free radio network port (Internationally acceptable)
C2363A-33 – x	Teleterm M3R3e	Teleterm M3Re Programmable RTU equipped with 10/100 Ethernet Port and integral 868MHz 315mW licence-free radio network port (Europe (CE) and South Africa only)
C2363A-34 – x	Teleterm M3R4e	Teleterm M3Re Programmable RTU equipped with 10/100 Ethernet Port and integral 900MHz 1W FHSS licence-free radio network port (USA, Australia only)

x = 1 for ISaGRAF IEC61131 Programming option; 0 or omit if not required.

## ACCESSORIES

C6169	Conet Terminator Board	
M1831A	MX Custom Serial Cable	RS232 Male DB9 connector (PC end) to FC11 (Target end) 2 metres.
M1832A	Conet Patch Cable	Male DB9 connector (CPU end) to loose ends. 2 metres. Use to connect M3C to C6169 Conet Terminator.
M1833A	MX RS232/485 Serial Patch Cable	RS232/485 Female DB9 connector (M3 end) to loose ends. 2 metres.
M1838A	USB Programming Cable	USB-A to USB Mini-B cable

