DIN RAIL SIGNAL CONDITIONERS, WITH TFML.

MEDACS

> **TEMPERATURE, PROCESS OR FREQUENCY INPUT**

> **SINGLE CHANNEL OR DUAL CHANNEL**

> **PROCESS VALUE DISPLAY**

> **MATHS FUNTION**

> **TOTALISER FUNCTION WITH FREQUENCY VERSION**

> **RS485 COMMS OR PUSH BUTTON SET UP**

> **ETHERNET COMPATIBLE**

INTRODUCTION

The MEDACS intelligent signal conditioner consists of a family of DIN rail modules, each one having a high degree of functionality and configurability via a RS485 MODBUS serial communications interface or through push buttons on the single channel version. They are suitable for RTD, Thermocouple, Voltage, Current and Frequency signals and provide an isolated (4 to 20) mA re-transmission signal, 2 changeover trip relays or 4 normally open relays or various combinations.

For high density systems, dual channel versions are available or for systems that require more local input, single channel versions with an in-built keypad and digital display are available where functions can be accessed via the front panel keys.

Each unit comes complete with a RS485 serial communications port which enables the devices to be integrated into a complete process control system. Unit wiring is simplified and speeded up by using the integral 'bus jumper' system provided with each unit which removes the need for complicated and expensive back plane wiring.

The functionality is further enhanced by the inclusion of a Transfer Function Module Library (TFML) which enables complex transfer functions to be loaded into the device. These can be tank linearisation curves, signal accumulators, maximum and minimum data logging etc. all of which can be downloaded from our website www.status.co.uk. Alternatively, we can write custom functions to suit your specific application and multiple devices can be grouped together to provide solutions for complex applications requiring more variables.

TRANSFER FUNCTION MODULE LIBRARY (TFML)

TFML has been designed to offer the user enhanced power and flexibility by providing a mechanism whereby each unit can be customised to perform a particular function. We can also write a TFML function to suit your specific application.

Common Modules are listed below and are available from our web site. They are simply down-loaded into the MEDACS unit.

USER LINEARISATION CHARACTERISTICS
x y segments or polynomials can be entered

SAMPLE TRANSFER FUNCTION MODULE LIBRARY PROGRAMS
Rate of change limiter
Peak Pick/Hold
Valley Pick/Hold
(A + B)/2
A - B
Sensor Validation

Wires to Power and communications to one connector are Bussed to all.

bus jumpers
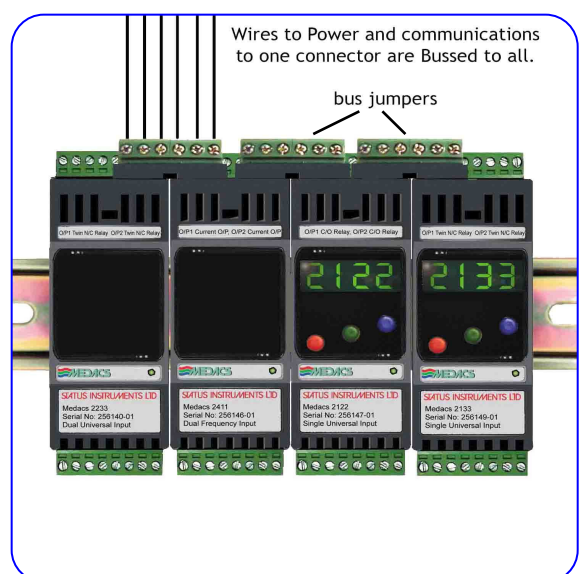
DIN RAIL SIGNAL CONDITIONERS, WITH TFML.

SPECIFICATIONS @ 20 ° C

INPUTS

Universal Input Overview

SENSOR	RANGE
mA	(4 to 20), ± 20, ± 10
RTD	Pt100, Ni120
TC	K, J, T, R, S, E, N, L, B
Volts	± 0.1, ± 10, ± 1, ± 5, (1 to 5)
	Slidewire*

CURRENT INPUT

Base Accuracy	0.05 % FS ± 0.05 % of reading
Thermal Drift	0.02 %/°C
Input Impedance	20 Ω
Linearisation	Linear, Square root, Power 3/2, Power 5/2, Custom

Two isolated and regulated 19 V power supplies are available to power the current loops, and are capable of sourcing 25 mA for each channel.

RTD

Sensor Range		(-200 to 850) °C
Linearisation		BS EN 60751/jisc 1604/Custom
Basic Accuracy		0.1 °C ± 0.0 5% of reading
Thermal Drift	Zero	± 0.004 Ω /°C
	Span	0.01 %/°C
Excitation Current		1 mA
Lead Resistance Effect		0.002 °C/ Ω
Max. Lead Resistance		50 Ω /leg

THERMOCOUPLE

TYPE	RANGE (°C)
K	-200 to 1370
J	-200 to 1200
T	-210 to 400
R[*1]	-10 to 1760
S[*1]	-10 to 1760
E	-200 to 1000
L	-100 to 600
N	-180 to 1300
B[*2]	-10 to 1650
Custom	-1999 to 9999

Accuracy		± 0.04 % FS ± 0.04 % reading or ± 0.5 °C, whichever is greater
Linearisation		BS 4937/IEC 584-3/Custom
Cold Junction Error		± 0.5 °C
Cold Junction Tracking		0.05 °C/°C
Cold Junction Range		(-20 to 60) °C
Thermal Drift	Zero	4 µV /°C
	Span	0.02 % /°C

*Notes:
1   Accuracy true for (800 to 1760) °C
2   Accuracy true for (400 to 1650) °C

VOLTAGE INPUT

Range	± 100 mV, ± 1 V, ± 5 V, ± 10 V, (1 to 5) V
Accuracy	0.04 % FS ± 0.04 % of reading
Thermal drift	0.02 %/°C
Input impedance	1 M Ω
Linearisation	Linear, Square root, Power 3/2, Power 5/2, Custom
*Slidewire	3 wire Potentiometer inputs can be accommodated between 50 Ω & 10 K Ω

FREQUENCY INPUTS

A wide range of input types and frequencies can be accommodated without the need for Switches or Jumpers. Totalise functions are a standard feature on the single channel version and are stored during power down.
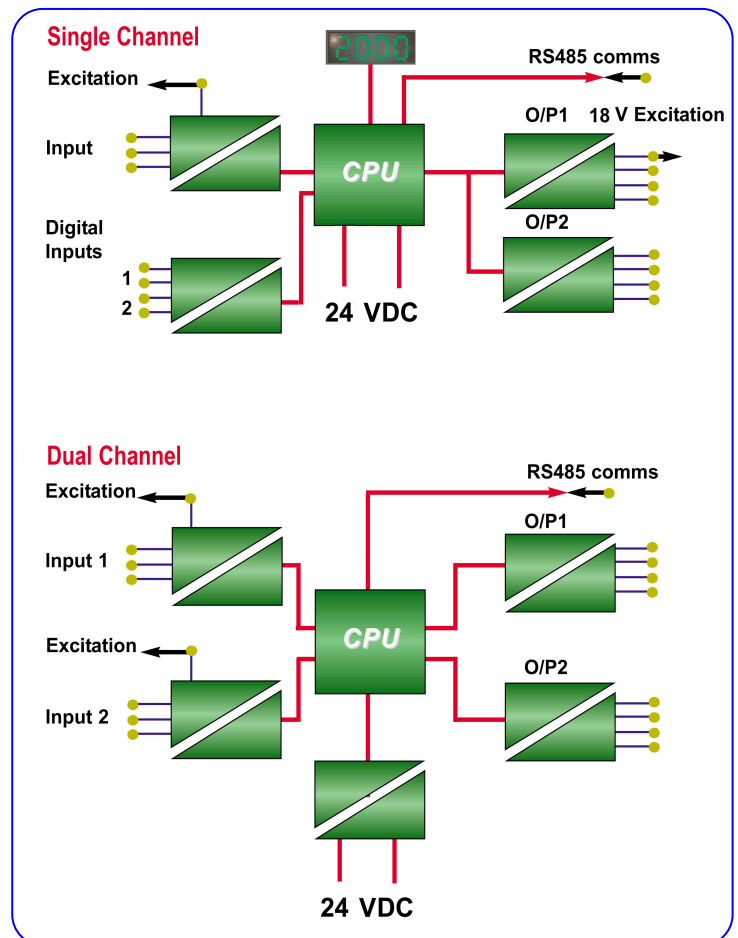
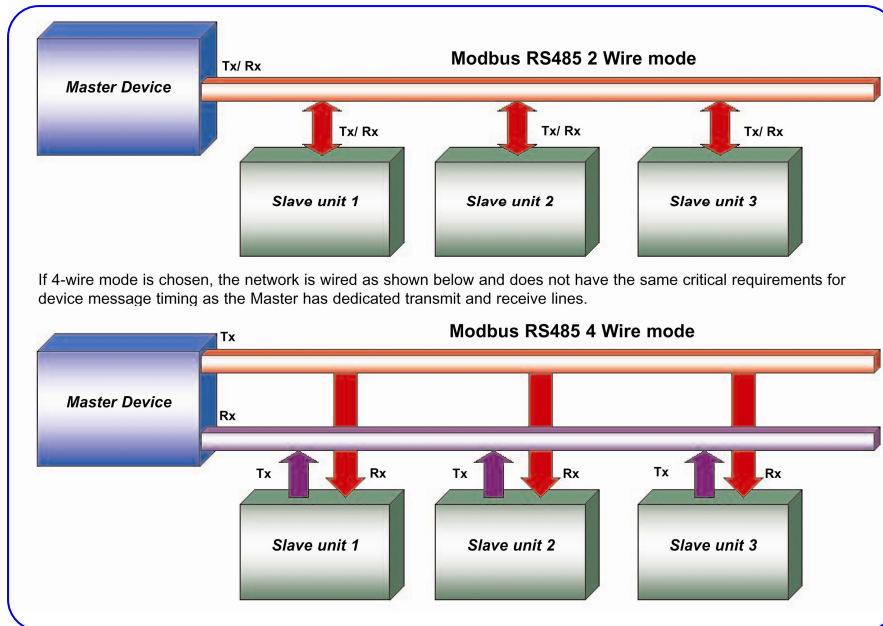|	
Input Types	Namur, low Voltage (> 10 mV), TTL, Open Collector, PFC
Frequency range	0.1 Hz to 20 kHz.
Accuracy	0.003 % FS

DIGITAL INPUTS

Single channel units can also accept two external digital inputs which can be TTL, Open Collector, 24 V DC Logic or Potential Free Contacts. Dig 1 is dedicated to a reset/clear function enabled by the configuration software whilst Dig 2 is reserved for use with TFML. Both digitals can be read via the communications and used to signal events.

OUTPUTS

Two output option types are available per channel, relay or current re-transmission. The configuration of these will vary depending upon whether they are fitted on the single or dual channel transmitter.

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If 4-wire mode is chosen, the network is wired as shown below and does not have the same critical requirements for device message timing as the Master has dedicated transmit and receive lines.

CURRENT RE-TRANSMISSION OUTPUTS

Output Range
Refer to Medacs Availability Table

Maximum Current Output	< 23 mA
Accuracy	0.07 % or 5 µA, whichever is greater
Max. Power Supply	30 V (in Sink mode)
Temperature Stability	5 µA / ˚C

*Note: Maximum source load 750 Ω

RELAY OUTPUTS

Two relay options are available, either a single changeover or twin independent relays with Normally closed contacts.*¹

Alarm Action	Off, High, Low, Deviation, Test
Hysteresis	Programmable (0 to 100) %
Delay Time*²	Programmable
Start-up Delay	Programmable

	AC	DC
Max. Switching Voltage	48 V RMS	48V
Max. Current	1 A @ 48 V	1 A @ 30 V
Max. Power	60 VA	30 W
Contact Resistance	< 100 mΩ	
Operate Time	< 5 ms	
Electrical Life @ Full Load	100,000 operations	
Mechanical Life	10,000,000 operations	

*Notes:
1. Contacts are Normally Closed i.e the contact is closed at power off and when operating in an alarm condition. The contact opens in the absence of an alarm condition. The active function can be reversed in software.
2. Alarm must be continuously present for this period in order to be recognised

GENERAL

Response Time	300 ms
Filter	Programmable or Adaptive
Power Requirements	24 VDC ± 10 % @ 200 mA
Breakdown Isolation	1 kV I/P~O/P~PSU
Ambient Operating Range	(-30 to 60) ˚C
Ambient Storage	(-50 to 85) ˚C
Ambient Humidity	(10 to 90) % RH
EMC Emissions	BS EN61326
EMC Immunity	BS EN61326
Display Range	-1999 to 9999

SERIAL COMMUNICATIONS

Each MEDACS 2000 module comes supplied with RS485 serial communications using MODBUS rtu protocol as standard.

Baud Rate	19.2 kB, 9.6 kB or 1.2 kB
Mode	2 wire or 4 wire available
Device Address	Network unique address
Default	4 wire 19.2 kB address 0

(*Note: that maximum device no. for Modbus is 247)

MODBUS

Modbus is a Master-Slave based communications protocol. This means that all messages are initiated by the Master device. In general the Master will communicate with one Slave device at a time, although it is possible under certain circumstances for the Master to broadcast to the entire network. The MEDACS units are Slave devices.

The RS485 mode determines the way that the network is connected together. The 2-wire arrangement, shown above, has both transmit and receive signals sharing the same wires. Although this makes most efficient use of the connections and makes wiring simpler, correct operation depends upon critical timing within the Master device.

DEVICE ADDRESSES

Each Slave unit requires a unique address. If two units have the same address on the network, both will respond when this address is accessed by the Master and a data corruption will result. Modbus defines a maximum address number of 247, but the electrical characteristics of RS485 limit the number of devices on a network to 32; however, buffering the network increases this number.

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MEDACS AVAILABILITY TABLE

Key:
U = Universal Temperature & Process
F = Frequency
Twin N/C = Two independent relays, closed in alarm and at power off
*1 = Sink only
*2 = Source and sink

MECHANICAL

| Part Number | Input | | Loop Power | | | Display |
	Channels	Type	Input	O/P 1	O/P2	
MED2100	Single	U	✓	✗	✗	✓
MED2111	Single	U	✓	Current O/P *1	Current O/P *1	✓
MED2113	Single	U	✓	Current O/P *2	Twin N/C	✓
MED2122	Single	U	✓	C/O relay	C/O relay	✓
MED2133	Single	U	✓	Twin N/C	Twin N/C	✓
MED2200	Dual	U	✓2	✗	✗	✗
MED2211	Dual	U	✓2	Current O/P *1	Current O/P *1	✗
MED2213	Dual	U	✓2	Current O/P *1	Twin N/C	✗
MED2222	Dual	U	✓2	C/O relay	C/O relay	✗
MED2233	Dual	U	✓2	Twin N/C	Twin N/C	✗
MED2300	Single	F	✗	✗	✗	✓
MED2311	Single	F	✗	Current O/P *1	Current O/P *1	✓
MED2313	Single	F	✗	Current O/P *2	Twin N/C	✓
MED2322	Single	F	✗	C/O relay	C/O relay	✓
MED2333	Single	F	✗	Twin N/C	Twin N/C	✓
MED2400	Dual	F	✗	✗	✗	✗
MED2411	Dual	F	✗	Current O/P *1	Current O/P *1	✗
MED2413	Dual	F	✗	Current O/P *1	Twin N/C	✗
MED2422	Dual	F	✗	C/O relay	C/O relay	✗
MED2433	Dual	F	✗	Twin N/C	Twin N/C	✗

55.0 mm
44.0 mm
35.0 mm
55.0 mm
86.0 mm
53.0 mm
58.6 mm
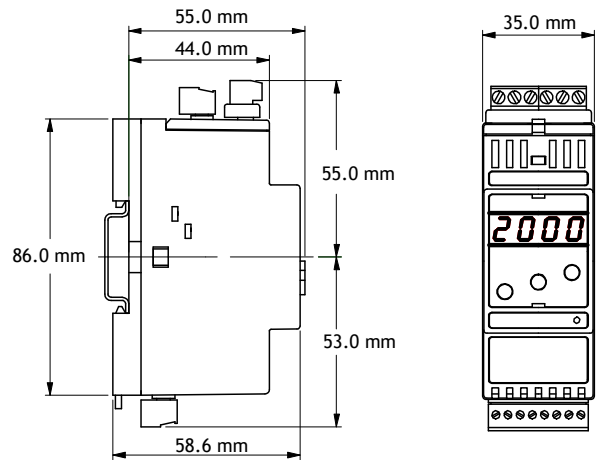
Note:
Not all possible combination are available as shown in the table below

ORDER CODES

MEDACS   2

SERIES

INPUTS	
1 x Universal (With Display, Keys & 2 discrete inputs)	1
2 x Universal	2
1 x Frequency (With Display, Keys & 2 discrete inputs)	3
2 x Frequency	4

OUTPUTS 1	
	0
(4 to 20) mA Re-transmission	1
C/O Relay	2
2 x N/C Relay	3

OUTPUTS 2	
	0
(4 to 20) mA Re-transmission	1
C/O Relay	2
2 x N/C Relay	3

The following software packages are available from Status Instruments Ltd which will run on Windows 95, 98, 2000 or NT

M-config	Medacs configuration tool and engineers toolbox. This package is available as a free download from www.status.co.uk
M-OPC *1	Full functionality OPC server.
M-SCADA-LITE *1	Scada package providing full animated display facilities and alarm monitoring with data logging and real time / historical trending for up to 50 data points working with Status products only. Supplied with Medacs drivers.
M-SCADA-PROFESSIONAL *2	As M-Scada-Lite for up to 100 points with additional recipe handling, batch data facilities, on line plant maintenance and report genarator. Supplied with Medacs drivers.

A variety of waterpoof, wall mounted enclosures are available for the Medacs units. Please contact the sales office for more information.
*1   The OPC server can be used with a host of other propriety OPC compliant Scada packages.
*2   Both packages can be upgraded to a complete and fully functional Scada system accomadating many thousands od data points and compatible with all major instrumentation manufacturers and suppliers.

STATUS INSTRUMENTS