

EMS700V0-R00

Remote Monitoring System

(For Power Meters)

User Manual

This document applies to Product	9001-0148
Build Version	3600-0207
Firmware Version	5000-0457

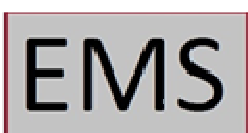
Version History:

S. No.	Version No.	Changes Made	Date Modified	Modified By	Approved By
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EMS700V0-R00

Data Logger (Eltrac)

1. Introduction

The EMS700 is a data logger and communication device which is intended to monitor Eltrac meters (single or three phase power meter and AC/DC meters), site security, and other critical conditions. It gets all this information from Eltrac meters through RS485 communication. It also has the ability to transfer this data to Remote server on request.

The collected data is then used to monitor and action, alarms and log these alarms in an internal memory.

The unit is intended to be fitted into an enclosure so that it provides a ready to use solution.

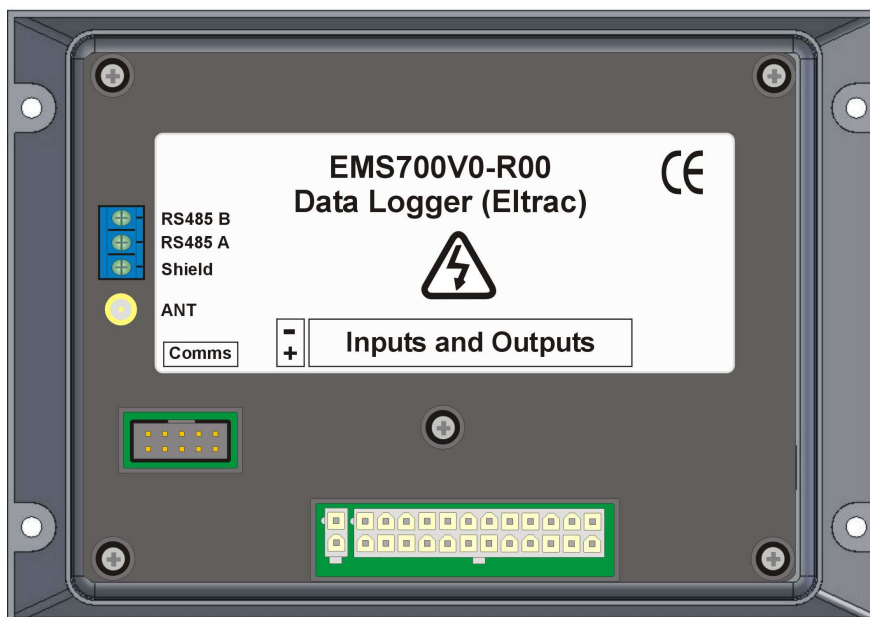
2. Benefits

- Provides comprehensive real time knowledge of the network supporting infrastructure.
- Provides immediate knowledge of infrastructure failure to ensure maximum availability.
- Improves network reliability.
- Provides automatic SMS messages to local service providers in the event of site failure.
- Reduces network operating costs.

3. Physical Form



Front View



Rear View

4. Functions

4.1 Digital Inputs

Function	Description
Digital Inputs	General purpose digital inputs are provided to allow remote status detection of connected inputs.

5. Operation



Front Layout

5.1 Buttons

Button	Function Description
	Menu Previous 1. Used as system menu previous button
	Menu Next 1. Used as system menu next button
	Accept button / Setup Menu Entry 1. Used to accept system events and silence the sounder 2. Used to enter the Setup mode
	Screen Scroll up / Setup menu up Button 1. Screen Scroll up Button 2. Used as the system menu up and value increment button

Button	Function Description
	Screen Scroll down / Setup menu down Button - Screen Scroll down Button - Used as the system menu down and value decrement button

5.2 LEDs

Button	Function Description
 Alarm	Alarm Indicates system alarm

5.3 Initial Power Up

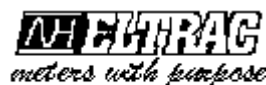
On power up, the unit displays the Logo.

The unit then displays the Serial number, Application Code and Firmware version.

The unit remains on for 1 minute and if no button is pressed, it goes into sleep mode to conserve battery power. In this mode the unit wakes periodically to check the availability of digital inputs or data on its RS485 port and if it finds something it starts logging data.

6. Display Operation

6.1 When the unit is on:



Screen - 1

V4 .AE .0D

Screen – 2

A	VOLTS	L-N
R	231	
Y	232	
B	233	

Screen – 3

A	AMPS	HERTZ
R	8.1	50.9
Y	9.1	50.9
B	10.1	50.9

Screen - 4

A	KW	P.F.
R	+ 192	+09
Y	+ 202	+09
B	+ 212	+09

Screen - 5

A	ET5011	KWHours
		000123457

Screen - 6

A	ET5011	COM STATUS
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OK

Screen - 7

 **Clock**
00:13:16
01/Jan/2000

7. Alarms and Warnings

The digital inputs alarms which are generated by the site are send as an SMS to the configurable cell number. Alarms are indicated by fast flashing of the ALARM LED and displaying the appropriate message on the LCD.

Message	Function description
Door Input	The Door input was activated

8. Inputs Electrical Specification

Input	Type	Comment
Battery + Volts	Power	Nominal 12VDC or 24VDC or Station Battery Supply Max 36VDC
0V Common	Power	0VDC, Common
Input I/P1	Digital	Suitable for switch input. Becomes active when closed to 0V

9. Navigating in the setup menu

The setup menu comprises a range of columns where each column comprises of a list of items and each item has a range of settable values.

Column Headings are as follows.

System	Logging	Comms	SMS Phone Num1	SMS Phone Num2	SMS Phone Num3	SMS Phone Num4
SMS Phone Num5	Server SMS.	Server-Addr	Server Port	Storage URL	APN	APN User
APN Pass	Latitude	Longitude	Date and Time			



The  button is used to select the previous column, Item, or to increment a value.



The  button is used to select the next column, item, or to decrement a value.



The  button changes from Column to item to value editor.



The  button changes from Item to column and exit setup mode.



The  button is used to accept value changes.

Setup mode automatically terminates if no button is pressed for 60 seconds, or when you

press the  button with the column headers list visible.

9.1 System Column

Item	Range	Default	Description
Contrast	0 - 11	4	LCD Contrast
Site ID	0 – 30000	0	Site Identifier. May also be used for asset numbering.
Defaults	NO YES	NO	Setting to Yes will load all configuration items to their factory default values. Note: Engine calibration will be lost.
Disp Update	OFF 2 – 60 sec	3	Display Cycle Time, sets frequency of display update. If set to Off, display scrolling is disabled. For manual scrolling press the  for the previous measurement screen and the  next measurement screen.
Disp Hold	5 – 60 sec	30	Display hold time. Sets the duration of display hold when the alarm button is pressed to halt the scrolling
Cust Logo	Yes	Yes	Show or hide the Customer Logo
LCD Reverse	No Yes Cycle	Cycle	No = LCD is adjusted to work best in daylight Yes = LCD is adjusted to word best at night Cycle = LCD Day and Night Adjustments are cycled

9.2 Logging

Item	Range	Default	Description
LogTime	5-120M	5M	It is the time set the by user for data logging.
Rem ET5011A	1-240	1	Modbus address
Rem ET5011B	1-240 Off	Off	Modbus address
Reg ET5011A	1-200	94	Modbus address
Reg ET5011B	1-200 Off	94	Modbus address

9.3 Comms (Communications) Setup Column

Item	Range	Default	Description
Comms ID	1 - 240	117	Comms Address. Required for remote communications
Baud Rate	1200 2400 4800 9600 19200 38400 57600	9600	Comms Port Baud Rate
Data Bits	7 – 9	8	Number of Data Bits
Parity	Even Odd None	None	Parity Select
Stop Bits	1 or 2	1	Number of Stop Bits
UART Mode	None Modem	None	RS232 Handshaking Mode None = No RTS/CTS control. 3 wire connection. Modem = Uses RTS/CTS flow control. 5 wire connection.
SMS Enable	Off On	On	Off = No SMS's are sent when the engine stops for an Alarm On = Sends SMS's when engine stops for a alarm and when the engine starts

9.4 SMS Phone Num 1 Column.

Item	Range	Default	Description
SMSPH Dig 1	0 – 9 END +	0	“0 – 9” = Numerical part of a phone number “END” = digit not used “+” = Used to get an international dial tone “ ” = Used to get a delay when a Pager system is used instead of SMS system
SMSPH Dig2		2	
SMSPH Dig3		1	
SMSPH Dig4		0	
SMSPH Dig5		2	
SMSPH Dig6		9	
SMSPH Dig7		7	
SMSPH Dig8		0	
SMSPH Dig9		6	
SMSPH Dig10		9	
SMSPH Dig11		7	
SMSPH Dig12		END	
SMSPH Dig13		END	
SMSPH Dig14		END	
SMSPH Dig15		END	
SMSPH Dig16		END	
SMSPH Dig17		END	
SMSPH Dig18		END	
SMSPH Dig19		END	
SMSPH Dig20		END	
SMSPH Dig21		END	
SMSPH Dig22		END	
SMSPH Dig23		END	
SMSPH Dig24		END	

9.5 SMS Phone Num 2 Column.

Item	Range	Default	Description
SMSPh Dig 1	0 – 9	END	“0 – 9” = Numerical part of a phone number “END” = digit not used “+” = Used to get an international dial tone “ ” = Used to get a delay when a Pager system is used instead of SMS system
SMSPh Dig2	END	END	
SMSPh Dig3	.	END	
SMSPh Dig4	+	END	
SMSPh Dig5		END	
SMSPh Dig6		END	
SMSPh Dig7		END	
SMSPh Dig8		END	
SMSPh Dig9		END	
SMSPh Dig10		END	
SMSPh Dig11		END	
SMSPh Dig12		END	
SMSPh Dig13		END	
SMSPh Dig14		END	
SMSPh Dig15		END	
SMSPh Dig16		END	
SMSPh Dig17		END	
SMSPh Dig18		END	
SMSPh Dig19		END	
SMSPh Dig20		END	
SMSPh Dig21		END	
SMSPh Dig22		END	
SMSPh Dig23		END	
SMSPh Dig24		END	

9.6 SMS Phone Num 3 Column.

Item	Range	Default	Description
SMSPH Dig 1	0 – 9 END . +	END	“0 – 9” = Numerical part of a phone number “END” = digit not used “+” = Used to get an international dial tone “ ” = Used to get a delay when a Pager system is used instead of SMS system
SMSPH Dig2		END	
SMSPH Dig3		END	
SMSPH Dig4		END	
SMSPH Dig5		END	
SMSPH Dig6		END	
SMSPH Dig7		END	
SMSPH Dig8		END	
SMSPH Dig9		END	
SMSPH Dig10		END	
SMSPH Dig11		END	
SMSPH Dig12		END	
SMSPH Dig13		END	
SMSPH Dig14		END	
SMSPH Dig15		END	
SMSPH Dig16		END	
SMSPH Dig17		END	
SMSPH Dig18		END	
SMSPH Dig19		END	
SMSPH Dig20		END	
SMSPH Dig21		END	
SMSPH Dig22		END	
SMSPH Dig23		END	
SMSPH Dig24		END	

9.7 SMS Phone Num 4 Column.

Item	Range	Default	Description
SMSPh Dig 1	0 – 9	END	“0 – 9” = Numerical part of a phone number “END” = digit not used “+” = Used to get an international dial tone “ ” = Used to get a delay when a Pager system is used instead of SMS system
SMSPh Dig2	END	END	
SMSPh Dig3	.	END	
SMSPh Dig4	+	END	
SMSPh Dig5		END	
SMSPh Dig6		END	
SMSPh Dig7		END	
SMSPh Dig8		END	
SMSPh Dig9		END	
SMSPh Dig10		END	
SMSPh Dig11		END	
SMSPh Dig12		END	
SMSPh Dig13		END	
SMSPh Dig14		END	
SMSPh Dig15		END	
SMSPh Dig16		END	
SMSPh Dig17		END	
SMSPh Dig18		END	
SMSPh Dig19		END	
SMSPh Dig20		END	
SMSPh Dig21		END	
SMSPh Dig22		END	
SMSPh Dig23		END	
SMSPh Dig24		END	

9.8 SMS Phone Num 5 Column.

Item	Range	Default	Description
SMSPH Dig 1	0 – 9 END +	END	“0 – 9” = Numerical part of a phone number “END” = digit not used “+” = Used to get an international dial tone “ ” = Used to get a delay when a Pager system is used instead of SMS system
SMSPH Dig2		END	
SMSPH Dig3		END	
SMSPH Dig4		END	
SMSPH Dig5		END	
SMSPH Dig6		END	
SMSPH Dig7		END	
SMSPH Dig8		END	
SMSPH Dig9		END	
SMSPH Dig10		END	
SMSPH Dig11		END	
SMSPH Dig12		END	
SMSPH Dig13		END	
SMSPH Dig14		END	
SMSPH Dig15		END	
SMSPH Dig16		END	
SMSPH Dig17		END	
SMSPH Dig18		END	
SMSPH Dig19		END	
SMSPH Dig20		END	
SMSPH Dig21		END	
SMSPH Dig22		END	
SMSPH Dig23		END	
SMSPH Dig24		END	

9.9 Server SMS

Item	Range	Default	Description
Type	Any	Any Server	Any = SMS from any phone number will be actioned. Server = SMS from phone numbers which are on the list will be actioned.
SMSPh Dig 1	0 – 9 END +	0	“0 – 9” = Numerical part of a phone number “END” = digit not used “+” = Used to get an international dial tone “ ” = Used to get a delay when a Pager system is used instead of SMS system
SMSPh Dig2		2	
SMSPh Dig3		1	
SMSPh Dig4		0	
SMSPh Dig5		2	
SMSPh Dig6		9	
SMSPh Dig7		7	
SMSPh Dig8		0	
SMSPh Dig9		6	
SMSPh Dig10		9	
SMSPh Dig11		7	
SMSPh Dig12		END	
SMSPh Dig13		END	
SMSPh Dig14		END	
SMSPh Dig15		END	
SMSPh Dig16		END	
SMSPh Dig17		END	
SMSPh Dig18		END	
SMSPh Dig19		END	
SMSPh Dig20		END	
SMSPh Dig21		END	
SMSPh Dig22		END	
SMSPh Dig23		END	

SMSPH Dig24		END	
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9.10 Server-Addr

Item	Range	Default	Description
SA1	0,1,2,3,4,5, 6,7,8,9,a,b,c ,d,e,f,g,h,i,j, k,l,m,n,o,p, q,r,s,t,u,v,w ,x,y,z,.-, ,END	e	0,1,2,3,4,5,6,7,8,9= Numerical part of a IP address a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w, x,y,z =Alphabetical part of a URL address . = Character part of Server address and URL address -= Character part of URL address END= digit not used
SA2		m	
SA3		s	
SA4		-	
SA5		n	
SA6		z	
SA7		.	
SA8		n	
SA9		o	
SA10		-	
SA11		i	
SA12		p	
SA13		.	
SA14		b	
SA15		i	
SA16		z	
SA17		END	
SA18		END	
SA19		END	
SA20		END	
SA21		END	
SA22		END	
SA23		END	
SA24		END	
SA25		END	

SA26		END	
SA27		END	
SA28		END	
SA29		END	
SA30		END	
SA31		END	

9.11 Server Port

Item	Range	Default	Description
Port	1-30000	80	TCP Port for communication.

9.12 Storage URL

Item	Range	Default	Description
SU1	0,1,2,3,4,5,6,7,8,9,a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w,x,y,z,A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z,.-,/,END	/	0,1,2,3,4,5,6,7,8,9= Numerical part of a IP address a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w,x,y,z =Lower case alphabetical part of a URL address A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q,R,S,T,U,V,W,X,Y,Z =Upper case alphabetical part of a URL address . = Character part of Server address and URL address - = Character part of URL address / = Character part of URL address END= digit not used
SU2		D	
SU3		a	
SU4		t	
SU5		a	
SU6		L	
SU7		o	
SU8		g	
SU9		g	
SU10		e	
SU11		r	
SU12		/	
SU13		A	
SU14		P	
SU15		I	
SU16		S	

SU17		t	
SU18		o	
SU19		r	
SU20		e	
SU21		D	
SU22		a	
SU23		t	
SU24		a	
SU25		.	
SU26		p	
SU27		h	
SU28		p	
SU29		END	
SU30		END	
SU31		END	
SU32		END	
SU33		END	
SU34		END	
SU35		END	
SU36		END	
SU37		END	
SU38		END	
SU39		END	
SU40		END	
SU41		END	
SU42		END	
SU43		END	
SU44		END	

SU45		END	
SU46		END	
SU47		END	
SU48		END	
SU49		END	

9.13 APN

Item	Range	Default	Description
APN1	0,1,2,3,4,5,6,7,8,9,a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w,x,y,z,.,-,END	i	0,1,2,3,4,5,6,7,8,9= Numerical part of a APN address a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w,x,y,z = Alphabetical part of a APN address. .= Character part of APN address -= Character part of APN address END= digit not used
APN2		n	
APN3		t	
APN4		e	
APN5		r	
APN6		n	
APN7		e	
APN8		t	
APN9		END	
APN10		END	
APN11		END	
APN12		END	
APN13		END	
APN14		END	
APN15		END	
APN16		END	
APN17		END	
APN18		END	
APN19		END	
APN20		END	

APN21		END	
APN22		END	
APN23		END	
APN24		END	
APN25		END	
APN26		END	
APN27		END	
APN28		END	
APN29		END	
APN30		END	
APN31		END	

9.14 APN User

Item	Range	Default	Description
User1	0,1,2,3,4,5,6,7,8,9,a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w,x,y,z,.,-,END	n	0,1,2,3,4,5,6,7,8,9== Numerical part of an username. a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w,x,y,z = Alphabetical part of an username. .= Character part of an username -= Character part of an username END= digit not used
User2		o	
User3		n	
User4		e	
User5		END	
User6		END	
User7		END	
User8		END	
User9		END	
User10		END	
User11		END	
User12		END	
User13		END	
User14		END	

User15		END	
User16		END	
User17		END	
User18		END	
User19		END	
User20		END	
User21		END	
User22		END	
User23		END	
User24		END	
User25		END	
User26		END	
User27		END	
User28		END	
User29		END	
User30		END	
User31		END	

9.15 APN Pass

Item	Range	Default	Description
Pass	0,1,2,3,4,5 ,6,7,8,9,a, b,c,d,e,f,g, h,i,j,k,l,m, n,o,p,q,r,s, t,u,v,w,x,y ,z,.,-,END	n	0,1,2,3,4,5,6,7,8,9= Numerical part of a password a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w,x,y,z = Alphabetical part of a password . = Character part of a password - = Character part of a password END= digit not used
Pass		o	
Pass		n	
Pass		e	
Pass		END	
Pass		END	
Pass		END	
Pass		END	
Pass		END	
Pass		END	
Pass		END	
Pass		END	
Pass		END	
Pass		END	
Pass		END	
Pass		END	
Pass		END	
Pass		END	
Pass		END	
Pass		END	
Pass		END	

Pass		END	
Pass		END	
Pass		END	
Pass		END	
Pass		END	

9.16 Latitude

Item	Range	Default	Description
Lat1	0,1,2,3,4,5 ,6,7,8,9,.,+ ,-,END	-	0,1,2,3,4,5,6,7,8,9= Numerical part of a password a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w,x,y,z = Alphabetical part of a password . = Character part of a password - = Character part of a password + = Character part of a password END= digit not used
Lat2		3	
Lat3		6	
Lat4		.	
Lat5		9	
Lat6		0	
Lat7		6	
Lat8		5	
Lat9		6	
Lat10		3	
Lat11		END	
Lat12		END	
Lat13		END	
Lat14		END	
Lat15		END	

9.17 Longitude

Item	Range	Default	Description
Long1	0,1,2,3,4,5 ,6,7,8,9,.,+ ,-,END	+	0,1,2,3,4,5,6,7,8,9= Numerical part of a password a,b,c,d,e,f,g,h,i,j,k,l,m,n,o,p,q,r,s,t,u,v,w,x,y,z = Alphabetical part of a password . = Character part of a password - = Character part of a password + = Character part of a password END= digit not used
Long2		1	
Long3		7	
Long4		4	
Long5		.	
Long6		6	
Long7		6	
Long8		0	
Long9		7	
Long10		6	
Long11		7	
Long12		END	
Long13		END	
Long14		END	
Long15		END	

9.18 Date and Time

Item	Range	Default	Description
Hour	0-23	0	Set the hours in data logger.
Minute	0-59	17	Set the Minutes in data logger
Second	0-59	15	Set the Seconds in data logger
Day	1-28	1	Set the Day in data logger
Month	Jan, Feb, Mar, Apr, May, Jun, July, Aug, Set, Oct, Nov, Dec.	Jan	Set the Month in data logger
Year	2000- 3000	2000	Set the Year in data logger
Week Day	Sun, Mon, Tue, Wed, Thr, Fri, Sat	Sun	Set the Week Day in data logger

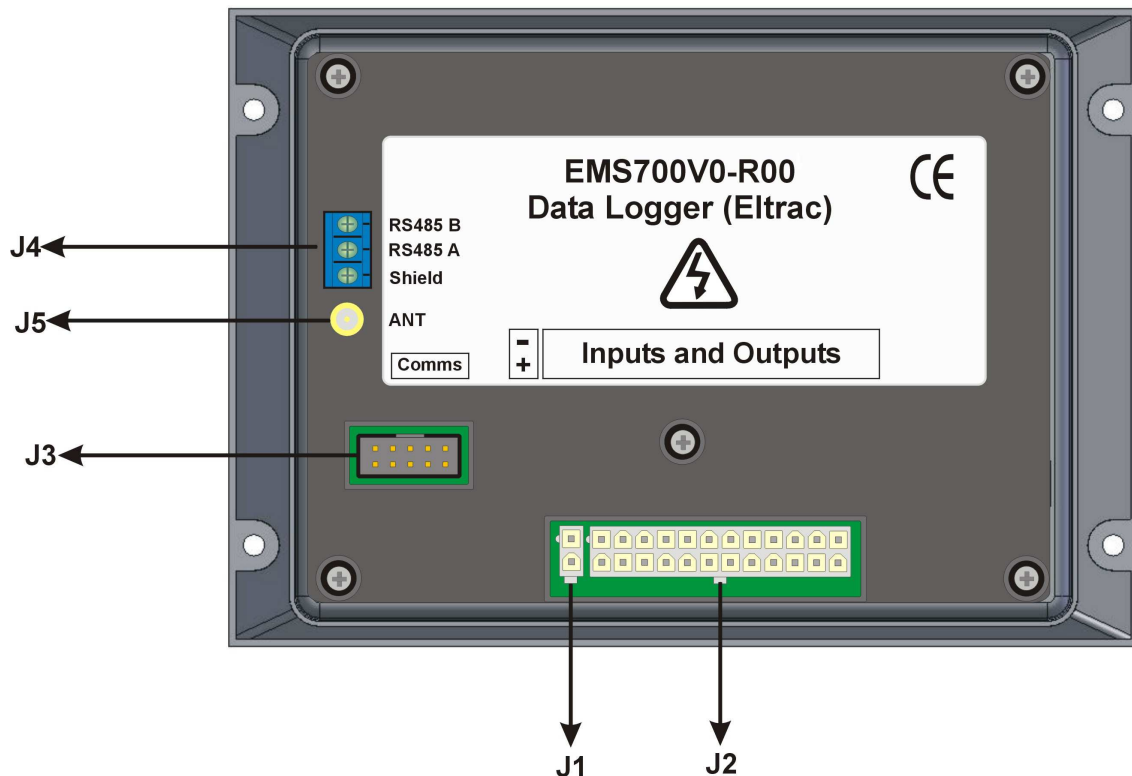
10. Communications

The unit is fitted with fully functional communication port (J3) which communicates using Modbus ASCII and RTU protocols. This port may be plugged into RS232 or RS485 communication adaptors and through these to a building management system. There is another RS485 port (J4) which is used to talk to the Eltrac meters to get their data and then send to remote server after regular intervals.

11. Unit General Specifications

Feature	Specification
Overall Dimensions	180 x 126 x 51mm
Mounting Hole	155 x 117mm
IP rating	IP56 front, IP20 rear
Supply Voltage	8 V to 36V DC Nominal Automotive
Operating Temperature	-20 to +70°C
Storage Temperature	-20 to +70°C
Relative Humidity	95% non condensing
Supply Current	Standby < 10mA Running 70mA
Overall Accuracy	Class 1
Digital Input Rating	Opto-coupler isolated. Whetting current 10mA at 12 V DC. DC input protection for +/- 30V DC Transient Protected.
Analog Input Rating	Current limited outputs approx 15mA or less as required by sensors/ Short circuit and reverse voltage protected.
Input Reference	0V Common
Set-up and Adjustment	All features may be adjusted using set-up buttons and LCD menu or via a PC Windows based utility
Terminations	Amp DUAC / Molex Mini Fit JNR

12. Installation and Wiring

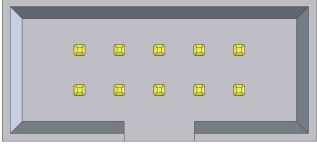
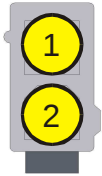
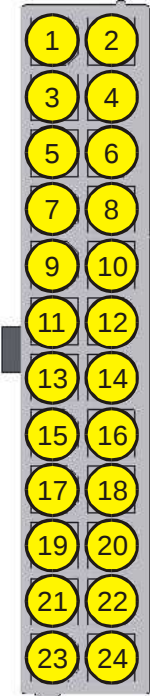


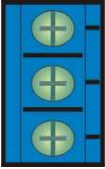
NB: The unit is a complex electronic device and caution should be taken to ensure correct wiring before power is applied.

The unit is fitted with 2, and 24 way Molex Minifit or equivalent socket connectors for which mating plugs can be selected from the Amp PE, or TPK range.

The unit is also fitted with RS485 connector and Antenna.

12.1 Connector Detail

Connector Assignment	Connection Information	
J3: Data Port 	Programming and Auxiliary Unit data port. NB: Connect ONLY manufacturer approved equipment to this port	
J1: DC Power Supply 	Pin	Connection
	1	Common –ve. <i>(Note 1)</i>
	2	Battery +ve. <i>(Note 2)</i>
J2: I/O 	Pin	Connection
	1	N/A
	2	N/A
	3	N/A
	4	N/A
	5	N/A
	6	N/A
	7	N/A
	8	N/A
	9	N/A
	10	N/A
	11	Door Input
	12	N/A
	13	N/A
	14	N/A
	15	N/A
	16	N/A
	17	N/A

Connector Assignment	Connection Information	
	18	N/A
	19	N/A
	20	N/A
	21	N/A
	22	N/A
	23	N/A
	24	N/A
J4: RS485 	Pin	Connection (See above for pin numbers)
	1	RS 485 B
	2	RS 485 A
	3	Shield
J5: Antenna 	Pin	Connection (See above for pin numbers)
	1	Antenna

Notes:

1. This connection must be made directly to the positive terminal of the battery for best performance. Do not make this connection to the positive terminal on the Starting Motor.

13. System Diagram

