



S.A DE CONSTRUCCIONES  
INDUSTRIALES

**DIRECT CONNECTION THREE  
PHASE ELECTRICITY METER  
MID CERTIFIED  
TCIDL3 - MID  
TCIDL3i - MID**

**INSTRUCTION MANUAL**

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This equipment meets the requirements of the European directive for safety and EMC. It's the responsibility of the installer ensure the continuity of the implementation of these directives in the rest of the installation.

## 1. INTRODUCTION

TCIDL3 – MID is a three-phase electricity meter with an RS485 and IR communication ports with MODBUS protocol, for DIN rail mounting and indoor usage. This meter complies with the standard EN 50470 – 1/3 for accuracy class B active energy and EN 62053- 23 class 2 for reactive energy. Its size is 71 mm for din rail. Four modules DIN.

It is intended for Mechanical environment M1 and Electromagnetic environment E2 in accordance with the 2014/32/EU directive.

This meter is also a network analyser, measuring other parameters of a three-phase line. The measured values can be shown on display or transmitted through the communication ports.

## 2. WORKING

### 2.1. Metering and Measurement.

TCIDL3 – MID measures positive and negative active energy and reactive energy in four quadrants. It also measures the instantaneous values of the electricity network where it is connected. This meter has multi tariff function, with weekend and holidays discrimination.

### 2.2. Digital outputs and inputs.

TCIDL3 MID has two SO outputs for active and reactive energy reemission. The model TCILD3i MID has only an SO output, instead the second output it has a digital input.

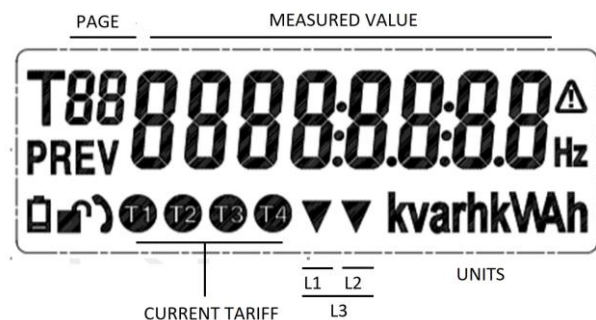
### 2.3. Display

TCIDL3 – MID meter has an LCD display of 51 x 17 mm, with blue backlight, for easy reading in dark places.

Below, there are four tables with the parameters shown in scroll mode, information mode and configuration mode.

TCIDL3 – MID has two touch buttons for display navigation and setting.

Display format.



At any time, the current tariff is indicated by the symbol Tx. The inverted triangles indicate the selected phase in individual phase information.

### 2.4 List of parameters shown.

In the page columns, T column shows the whole set of values, F the factory configuration selected values. When modifying the display configuration, the page numbering varies. All the parameters can be read through communication ports.

PARAMETER SCROLLING. AUTOMATIC OR SHORT KEY PRESS					
Page		Parameter	Unit	Format integer+decimal	Remark
T	F				
T01		Total active energy	kWh	6+2	
<b>02*</b>	<b>1</b>	<b>Forward active energy</b>	kWh	6+2	
<b>03*</b>	<b>2</b>	<b>Reverse active energy</b>	kWh	5+2	—
T04		T1 Total active energy	kWh	6+2	blink t1
<b>05*</b>	<b>3</b>	<b>T1 Forward active energy</b>	kWh	6+2	blink t1
06		T1 Reverse active energy	kWh	5+2	— blink t1
T07		T2 Total active energy	kWh	6+2	blink t2
<b>08*</b>	<b>4</b>	<b>T2 Forward active energy</b>	kWh	6+2	blink t2
09		T2 Reverse active energy	kWh	5+2	— blink t2
T10		T3 Total active energy	kWh	6+2	blink t3
<b>11*</b>	<b>5</b>	<b>T3 Forward active energy</b>	kWh	6+2	blink t3
12		T3 Reverse active energy	kWh	5+2	— blink t3
T13		T4 Total active energy	kWh	6+2	blink t4
14		T4 Forward active energy	kWh	6+2	blink t4
15		T4 Reverse active energy	kWh	5+2	— blink t4
T16		Total reactive energy	kvarh	6+2	
17		Forward reactive energy	kvarh	6+2	
18		Reverse reactive energy	kvarh	5+2	—
<b>T19*</b>	<b>6</b>	<b>Reactive energy Q1</b>	kvarh	6+2	blink q1
<b>T20*</b>	<b>7</b>	<b>Reactive energy Q2</b>	kvarh	6+2	blink q2
<b>T21*</b>	<b>8</b>	<b>Reactive energy Q3</b>	kvarh	6+2	blink q3
<b>T22*</b>	<b>9</b>	<b>Reactive energy Q4</b>	kvarh	6+2	blink q4
T23		T1 Total reactive energy	kvarh	6+2	blink t1
24		T1 Forward reactive energy	kvarh	6+2	blink t1
25		T1 Reverse reactive energy	kvarh	5+2	— blink t1
T26		T2 Total reactive energy	kvarh	6+2	blink t2
27		T2 Forward reactive energy	kvarh	6+2	blink t2
28		T2 Reverse reactive energy	kvarh	5+2	— blink t2
T29		T3 Total reactive energy	kvarh	6+2	blink t3
30		T3 Forward reactive energy	kvarh	6+2	blink t3
31		T3 Reverse reactive energy	kvarh	5+2	— blink t3
T32		T4 Total reactive energy	kvarh	6+2	blink t4
33		T4 Forward reactive energy	kvarh	6+2	blink t4
34		T4 Reverse reactive energy	kvarh	5+2	— blink t4
T35		Total resettable active energy	kWh	6+2	blink rESET
<b>36*</b>	<b>10</b>	<b>Forward resettable active energy</b>	kWh	6+2	blink rESET
<b>37*</b>	<b>11</b>	<b>Reverse resettable active energy</b>	kWh	5+2	— blink rESET
T38		Resettable reactive energy	kvarh	6+2	blink rESET
39		Forward resettable reactive energy	kvarh	6+2	blink rESET
40		Reverse resettable reactive energy	kvarh	5+2	— blink rESET
T41		Total maximum active power demand	kW	2+3	Pd
<b>42*</b>	<b>12</b>	<b>Forward maximum active power demand</b>	kW	2+3	Pd
<b>43*</b>	<b>13</b>	<b>Reverse maximum active power demand</b>	kW	2+3	Pd —
T44		Total maximum reactive power demand	kvar	2+3	Pd

<b>45*</b>	<b>14</b>	<b>Forward maximum reactive power demand</b>	kvar	2+3	Pd
<b>46*</b>	<b>15</b>	<b>Reverse maximum reactive power demand</b>	kvar	2+3	Pd —
<b>47*</b>	<b>16</b>	<b>Voltage L1</b>	V	3+2	L1
<b>48*</b>	<b>17</b>	<b>Voltage L2</b>	V	3+2	L2
<b>49*</b>	<b>18</b>	<b>Voltage L3</b>	V	3+2	L3
50		Voltage L1 L2	V	3+2	Blink L1L2
51		Voltage L2 L3	V	3+2	Blink L2L3
52		Voltage L3 L1	V	3+2	Blink L3L1
<b>53*</b>	<b>19</b>	<b>Current L1</b>	A	3+3	L1
<b>54*</b>	<b>20</b>	<b>Current L2</b>	A	3+3	L2
<b>55*</b>	<b>21</b>	<b>Current L3</b>	A	3+3	L3
<b>T56*</b>	<b>T22</b>	<b>Total active power</b>	kW	3+3	
57		Active power L1	kW	3+3	L1
58		Active power L2	kW	3+3	L2
59		Active power L3	kW	3+3	L3
<b>T60*</b>	<b>T23</b>	<b>Total reactive power</b>	kvar	3+3	
61		Reactive power L1	kvar	3+3	L1
62		Reactive power L2	kvar	3+3	L2
63		Reactive power L3	kvar	3+3	L3
<b>T64*</b>	<b>T24</b>	<b>Total apparent power</b>	KVA	3+3	
65		Apparent power L1	KVA	3+3	L1
66		Apparent power L2	KVA	3+3	L2
67		Apparent power L3	KVA	3+3	L3
<b>T68*</b>	<b>T25</b>	<b>Frequency</b>	Hz	2+1	
69		Frequency L1	Hz	2+1	L1
70		Frequency L2	Hz	2+1	L2
71		Frequency L3	Hz	2+1	L3
<b>T72*</b>	<b>T26</b>	<b>Power factor</b>		1+3	PF"C" or "L" and sign
73		Power factor L1		1+3	PF"C" or "L" and sign
74		Power factor L2		1+3	PF"C" or "L" and sign
75		Power factor L3		1+3	PF"C" or "L" and sign

Keeping pressed the checking key for three seconds switch the display page to scroll phase 1 energy information. Repeat the action for phase 2 and 3. Two inverted triangles indicate the selected phase. See format display in 2.2.

<b>PHASE L1, L2 OR L3 ENERGY PARAMETERS</b>				
<b>Page</b>	<b>Parameter</b>	<b>Unit</b>	<b>Format integer+ decimal</b>	<b>Remark</b>
T01	Total active energy	kWh	6+2	
02	Forward active energy	kWh	6+2	
03	Reverse active energy	kWh	5+2	—

T04	T1 Total active energy	kWh	6+2	Blink t1
05	T1 Forward active energy	kWh	6+2	Blink t1
06	T1 Reverse active energy	kWh	5+2	– Blink t1
T07	T2 Total active energy	kWh	6+2	Blink t2
08	T2 Forward active energy	kWh	6+2	Blink t2
09	T2 Reverse active energy	kWh	5+2	– Blink t2
T10	T3 Total active energy	kWh	6+2	Blink t3
11	T3 Forward active energy	kWh	6+2	Blink t3
12	T3 Reverse active energy	kWh	5+2	– Blink t3
T13	T4 Total active energy	kWh	6+2	Blink t4
14	T4 Forward active energy	kWh	6+2	Blink t4
15	T4 Reverse active energy	kWh	5+2	– Blink t4
T16	Total reactive energy	kvarh	6+2	
17	Forward reactive energy	kvarh	6+2	
18	Reverse active energy	kvarh	5+2	–
T19	reactive energy Q1	kvarh	6+2	Blink q1
20	reactive energy Q2	kvarh	6+2	Blink q2
21	reactive energy Q3	kvarh	6+2	Blink q3
22	reactive energy Q4	kvarh	6+2	Blink q4
T23	T1 Total reactive energy	kvarh	6+2	Blink t1
24	T1 Forward reactive energy	kvarh	6+2	Blink t1
25	T1 Reverse active energy	kvarh	5+2	– Blink t1
T26	T2 Total reactive energy	kvarh	6+2	Blink t2
27	T2 Forward reactive energy	kvarh	6+2	Blink t2
28	T2 Reverse active energy	kvarh	5+2	– Blink t2
T29	T3 Total reactive energy	kvarh	6+2	Blink t3
30	T3 Forward reactive energy	kvarh	6+2	Blink t3
31	T3 Reverse active energy	kvarh	5+2	– Blink t3
T32	T4 Total reactive energy	kvarh	6+2	Blink t4
33	T4 Forward reactive energy	kvarh	6+2	Blink t4
34	T4 Reverse active energy	kvarh	5+2	– Blink t4
T35	Total resettable active energy	kWh	6+2	Blink rESET
36	Forward resettable active energy	kWh	6+2	Blink rESET
37	Reverse resettable active energy	kWh	5+2	– Blink rESET
T38	Total resettable reactive energy	kvarh	6+2	Blink rESET
39	Forward resettable reactive energy	kvarh	6+2	Blink rESET
40	Reverse resettable reactive energy	kvarh	5+2	– Blink rESET
T41	Total maximum active power demand	kW	2+3	Pd
42	Forward maximum active power demand	kW	2+3	Pd
43	Reverse maximum active power demand	kW	2+3	Pd –
T44	Total maximum reactive power demand	kvar	2+3	Pd
45	Forward maximum reactive power demand	kvar	2+3	Pd
46	Reverse maximum reactive power demand	kvar	2+3	Pd –

After phase 3, a long key press access to the information display.

INFORMATION DISPLAY				
1	Serial number		12 digits	
2	MODBUS Address		1 to 247	Id
3	Baud rate	bauds	9600 / 19200 / 38400 / 115200	
4	Parity		odd, even, none	
5	Stop bits		1 or 2	StoP
6	Automatic scrolling time	seconds	5 to 99, 0 disables	Lcd
7	Combined code			
8	Demand calculation mode and time	0 interval, 1 slide	Period from 1 to 30 minutes	d t
9	SO output			So
10	Date		DDMMAA	
11	Time		hhmmss	
12	Version		V301	
13	Checksum		0x2B60	crc

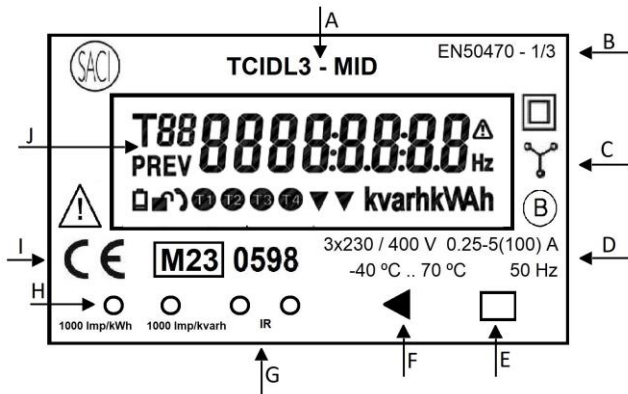
## 2.5. Configuration by keys

Keeping pressed the data setting key for three seconds switch to configuration mode.

The first step is to input the correct password, default 0000. Left key decreases value, right key increases the value, long press right key moves cursor until last digit.

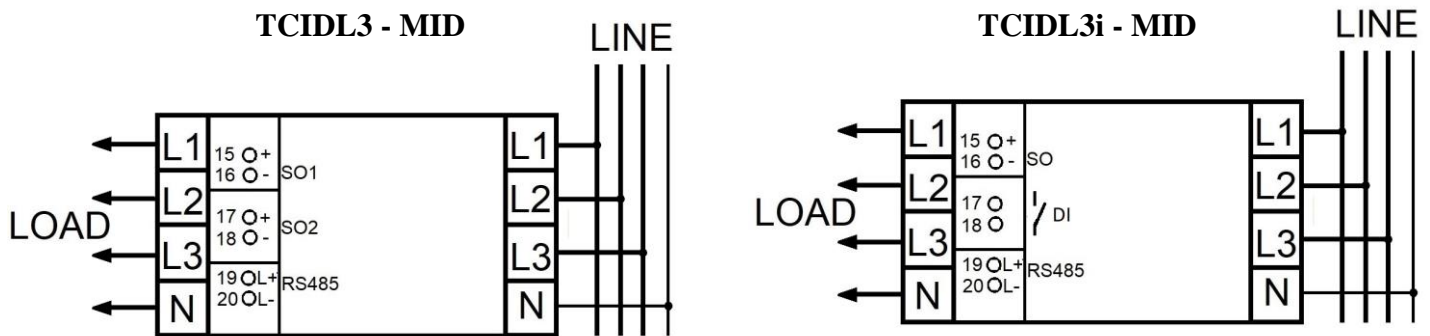
Setting display		
Key operation in configuration mode:		
Right key:		
Short press: increases value, next parameter. Long press: next digit, access to parameter		
Left key:		
Short press: decreases value, previous parameter. Long press: exit configuration		
01	MODBUS Address	1 to 247
02	Baud rate	9600 / 19200 / 38400 / 115200
03	Parity	Odd, even, none
04	Stop bits	1 or 2
05	Scrolling time	From 5 to 99 seconds. 0 disables automatic scroll
06	Combined code	1: Total = forward. 2: Total = reverse. 3: Total = forward + reverse. 4: Total = forward - reverse
07	Demand type and period	Type 0: interval. 1 Slide. Period 1 to 30 minutes
08	SO output value	Divisible values of 96000 above 100
09	Date	DDMMAA
10	Time	hhmmss
11	Reset active energy	In all cases, access with long press.
12	Reset reactive energy	Short press shows the different values can be reset. Select the desired values to reset with a long press. When resetting a value, its shared values are affected. Pe, when resetting total active energy, all active energy registers are resettled or when resetting a phase energy, its value is subtracted from the total value.
13	Reset active power maximum demand	
14	Reset reactive power maximum demand	
15	password	
16	Exit configuration	Four bytes

### 3. FRONT PANEL DESCRIPTION



- A Model.
- B Reference standards
- C Safety, three phase connection and class index symbols.
- D Reference values.
- E Data setting key.
- F Data checking key.
- G IR port.
- H Verification leds for active and reactive energy.
- I CE and metrological marking.
- J Display LCD.

### 4. CONNECTION DIAGRAMS



Terminals 15, 16, 17 and 18 are two SO outputs for active and reactive energy measured reemission. In model TCIDL3i-MID, terminals 17 and 18 are a digital input.  
 Terminals 19 and 20 are an RS485 port.  
 All these terminals must be left unconnected if not used. It is not needed their connection for a normal working of the meter.

### 5. INSTALLATION

#### 5.1 Safety indications

Before installing the meter read this instruction manual completely.

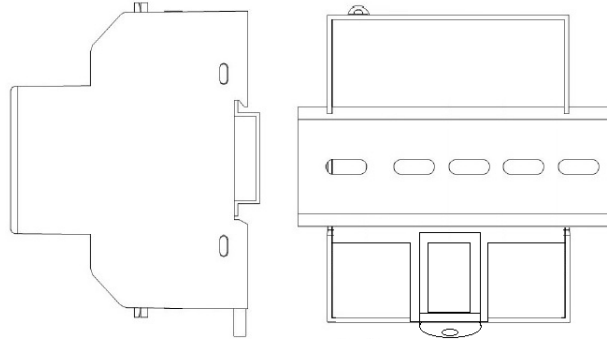
**- Serious injury, or fire hazard could result from improper connection of this instrument. Installation and mounting of this instrument must be performed by qualified personnel only.**

- Do not connect the meter without disconnecting mains voltage. Avoid field work unless another person can assist you.
- If the equipment is handled in a way not specified by the manufacturer, the equipment protection may be compromised.
- Do not use the meter if its plastic case is damaged and return it to your supplier. The meter must not be opened. No preventive maintenance is required. In case of failure, it must be sent to our facilities for repair and calibration.
- The device has not a circuit breaker, so this, protection must be provided in the general installation.
- Do not use the meter in explosive atmospheres, or in humid environments with possibility of condensation.

### 5.2. Mounting instructions.

This unit must be installed inside an electrical cabinet, so that the temperature and humidity do not exceed the working limits.

The plastic case is designed to be mounted in DIN rail of 35 mm x 7.5 mm. To release it from the rail, pull the clip and extract the meter from the rail.



### 5.3. Connections.

The meter is connected through screw terminals. The connection must be made according to its wiring diagram, indicated on the meter label and in this instruction manual.

### 6. DIMENSIONS

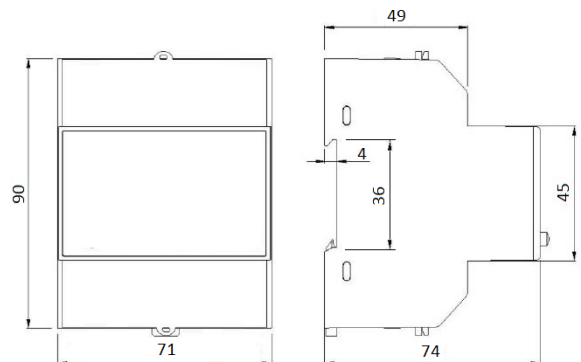
High	90 mm
Width	71 mm
Deep	74 mm
Weight	0.32 Kg

### 7. TECHNICAL FEATURES

<b>Voltage:</b>	3x230 / 400 V
Frequency	50 Hz
Burden	<10 VA; < 1 W

<b>Current:</b>	0.25 – 5 (100) A
Start current	20 mA
Burden	0.05 VA (at 5 A)

<b>Impulse output</b>	
SO output	12 a 27 V < 27 mA



**Generals:****Accuracy class:**

Active energy	class B EN50470 – 1
Reactive energy	2 EN62053 - 23
Instantaneous values	0.5
Verification constant	1000 Imp / kWh
<b>Working temperature</b>	-40° – 70 °C
Relative humidity. Annual average	≤ 75 %
Maximum humidity without condensation	≤ 95 %
Protection degree	IP51. Indoor usage
Case:	
UL94 degree	V0
Materials	
Base and cover	ABS+PC
Terminal box	PBT+GF
DIN rail clip	ABS
Modular box. Four modules	(71 mm)
Terminals	Sealable
Screw terminals	
Maximum wire section:	
Current terminals	25 mm <sup>2</sup>

**More information at “[www.saci.es](http://www.saci.es)”**

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SACI reserves the right to modify this specification without prior notice

MODBUS REGISTER ADDRESS HEX.	R/(W)	REGISTER LENGTH	DATA DESCRIPTION	UNIT	CONTENT
<b>INSTANTANEOUS VALUES</b>					
400	R	2	INT32(3+3)	V	L1 voltage
402	R	2	INT32(3+3)	V	L2 voltage
404	R	2	INT32(3+3)	V	L3 voltage
406	R	2	INT32(3+3)	V	L12 voltage
408	R	2	INT32(3+3)	V	L23 voltage
040A	R	2	INT32(3+3)	V	L31 voltage
040C	R	2	INT32(3+3)	V	PHASE AVERAGE VOLTAGE
040E	R	2	INT32(3+3)	V	LINE AVERAGE VOLTAGE
410	R	2	INT32(2+3)	A	L1 Current
412	R	2	INT32(2+3)	A	L2 Current
414	R	2	INT32(2+3)	A	L3 Current
416	R	2	INT32(2+3)	A	Current of NEUTRAL
418	R	2	INT32(2+3)	A	Three-phase Vector Sum Current
041A	R	2	INT32(5+0)	W	L1 active power
041C	R	2	INT32(5+0)	W	L2 active power
041E	R	2	INT32(5+0)	W	L3 active power
420	R	2	INT32(5+0)	W	Total active power
422	R	2	INT32(5+0)	VA	L1 apparent power
424	R	2	INT32(5+0)	VA	L2 apparent power
426	R	2	INT32(5+0)	VA	L3 apparent power
428	R	2	INT32(5+0)	VA	Total apparent power
042A	R	2	INT32(5+0)	var	L1 reactive power
042C	R	2	INT32(5+0)	var	L2 reactive power
042E	R	2	INT32(5+0)	var	L3 reactive power
430	R	2	INT32(5+0)	var	Total reactive power
432	R	1	INT16(2+1)	Hz	L1 frequency
433	R	1	INT16(2+1)	Hz	L2 frequency
434	R	1	INT16(2+1)	Hz	L3 frequency
435	R	1	INT16(2+1)	Hz	System frequency
436	R	1	INT16(1+3)		L1 power factor
437	R	1	INT16(1+3)		L2 power factor
438	R	1	INT16(1+3)		L3 power factor
439	R	1	INT16(1+3)		System power factor
<b>ENERGY VALUES</b>					
010E	R	2	INT32(6+2)	kWh	Forward active energy
118	R	2	INT32(6+2)	kWh	Reverse active energy
012C	R	2	INT32(6+2)	kvarh	Forward reactive energy
136	R	2	INT32(6+2)	kvarh	Reverse reactive energy
014A	R	2	INT32(6+2)	kvarh	Q1 reactive energy
154	R	2	INT32(6+2)	kvarh	Q2 reactive energy
015E	R	2	INT32(6+2)	kvarh	Q3 reactive energy
168	R	2	INT32(6+2)	kvarh	Q4 reactive energy
062E	R	2	INT32(6+2)	kWh	Forward active resettable energy
630	R	2	INT32(6+2)	kWh	Reverse active resettable energy
646	R	2	INT32(6+2)	kWh	Forward reactive resettable energy
648	R	2	INT32(6+2)	kWh	Reverse reactive resettable energy

METER PARAMETERS

1000	R	3			SERIAL NUMBER
1003	R/W	1	1-247		Modbus ID
1004	R	1	101		FIRMWARE VERSION
1005	R	1	101		HARDWARE VERSION
1006	R	1	XXXX		CHECKSUM
1007	R/W	4	00, YEAR, MONTH, DAY,WEEKDAY, HOUR,MINUTE,SECO ND		
100B	R/W	1	0 TO 99 0 DISABLES	SECONDS	CYCLE DISPLAY TIME
100C	R/W	1	6: 9600. 7: 19200. 8: 38400. 9: 115200		BAUD RATE
100D	R/W	1	0: NONE. 1: ODD. 2: EVEN		PARITY
100E	R/W	1	1: 1. 2: 2		STOP BIT
100F		1			RESERVED
1010	R/W	1	0 INTERVAL 1SLIP 1 TO 30 MINUTES DEFAULT 15		DEMAND MODE
1011	R/W	1			DEMAND CYCLE
1012		4			RESERVED
1016	R/W	1	0000 TO 9999		PASSWORD
1017			800, 1000, 1600, etc. above 100,divisible by 96000		S. O. OUTPUT
1018	R/W	2	STARS WHEN CURRENT IS GREATER THAN SETTED	SECONDS	METER RUNNING TIME
101A	R/W	2	SETTED CURRENT	mA	RUNNING TIME START CURRENT
101C		1			RESERVED
101D	R	1	INPUT STATUS	0, 1	ONLY TCIDL3i MID
2001	W	1	BIT 12 ACTIVE BIT 13 REACTIVE		RESET OF RESETABLE ACCUMULATORS
READ:                   FUNCTION CODE 0X03 AND 0X04 WRITE:                FUNCTION CODE 0X10 NEGATIVE VALUES ARE EXPRESSED IN TWO'S COMPLEMENT					