

شرکت محور آزماي فارس سيستم اتوماسيون آلام مجهز به ثبات خطا

MAL 20C

Automation System Alarm with event recorder

Content	Page
1- description	3
2-Specification	6
4-Show setting	11
5-change setting	13
6- Setting of system	16
7-Programming via USB	17
8- program and control via RS485	21
9- USB data collector (Mlink20)	24
10-TCS and alarm terminals	34
11-TCS operation	35
12 – Alarm terminals	38
13 Front panel view	39
14-Communication port	40
15-Change the front panel table	41
16-Ext. Horn off & Reset connection	42
17-Rear view	43
19-Alarm connection	44
20-System alarm box dimension	45
21-Panel cut out	46
22- installation	47

Description

سیستم آلام ۲۰ پنجره ای شرکت محور آزمای فارس

این سیستم تشکیل شده از حداکثر ۲۰ ورودی آلام که ورودی های ۱ و ۲ می توانند به صورت رله ناظر عملکرد تریپ (TCS) عمل نمایند. ورودی ها می توانند با زمینهای مجزا در نظر گرفته شوند .

هر ورودی از لحاظ زمان عملکرد ، انتخاب رله خروجی ، ابعاد پنجره نشاندهنده و Urgent یا Non Urgent بودن ، می تواند برنامه ریزی شود.

دو گروه خروجی (رله خروجی) وجود دارد که با برنامه ریزی می تواند به هر یک از آلام ها اختصاص یابد (Urgent/Nonurgent). خروجی سوم جهت اطمینان از سیستم پاور (Safety Relay) و خروجی چهارم (رله چهارم) مختص TCS می باشد.

سیستم دارای ۵ کلید می باشد که جهت برنامه ریزی و نشان دادن تنظیمات مورد استفاده قرار می گیرد. در صفحات ضمیمه نحوه استفاده از کلید ها آمده است.

هنگامی که یکی از ورودی ها تحریک می شود (آلام می آید) پنجره مربوط به آن آلام شروع به چشمک زدن می کند، در همان لحظه نام آن آلام و زمان وقوع آن روی LCD نمایش داده می شود ، همچنین رله خروجی اختصاص داده شده به این آلام تحریک شده و در صورتی که به آژیر متصل باشد آن آژیر به صدا در خواهد آمد. (با برنامه ریزی ، هر آلام می تواند به هر یک از دو رله خروجی ۱ و ۲ اختصاص یابد.)

با فشار کلید → (Horn off) آژیر متوقف می شود. در صورت اعمال کلید ACK پنجره از حالت چشمک به حالت ثابت در خواهد آمد. در صورتی که آلام بر طرف شده باشد ، با فشار کلید Reset صفحه LCD زمان را نشان داده و صفحه پنجره مربوطه خاموش می شود.

با اتصال کامپیوتر و یا Laptop به سیستم از طریق USB و اجرای برنامه FMA ALARM کنترل توسط کامپیوتر انجام می شود . در این حالت در پنجره status حالت های هر آلام را می توان مشاهده نمود. با وارد شدن به پنجره setting می توان هر یک از رله های خروجی را به هر آلام اختصاص داد . همچنین نام هر ورودی را (تا ۱۶ کارکتر) ثبت نمود . در این حالت ، هنگام آمدن آلام توضیحات آن روی LCD نوشته می شود. در این پنجره زمان تاخیر (delay) هر ورودی آلام را نیز می توان تغییر داد.

علاوه بر این ، زمان سیستم را مطابق زمان کامپیوتر **update** نمود و **TCS** را در سیستم فعال و یا غیر فعال کرد. همچنین می توان به هر آلام در یک سیستم تعداد پنجره ها را زیاد یا کم نمود . یعنی یک سیستم را از یک پنجره تا ۲۰ پنجره گسترش داد.

در صورتی که وارد پنجره **log** شویم می توان کلیه وقایع و وضعیت های مختلف **TCS** را همراه با زمان وقوع آنها ، مشاهده کرد و یا **event** ها را جهت بررسی و آنالیز به کامپیوتر انتقال داد.

ضمنا در منوی **Show log** روی **LCD** می توان آخرین آلام های ورودی همراه زمان وقوع آنها و همچنین زمان تغییر وضعیت **C.B.** را مشاهده نمود.

در این سیستم می توان از طریق پورت **RS485** به **RTU** وصل شده و توسط آن اطلاعات را ارسال نمود.

هنگامی که چند آلام وجود داشته باشد ، با استفاده از کلید های و می توان عمل **SCROLL** را انجام داده و توضیحات و زمان وقوع هر آلام را روی **LCD** مشاهده نمود . در زمانی که آلام وجود ندارد و سیستم زمان را نشان می دهد با فشار یا سیستم بطور اتوماتیک عمل تست داخلی را انجام می دهد.

در حالت برنامه ریزی و یا مشاهده **setting** در صورتی که کلیدی برای مدت زمان خاصی استفاده نشود ، سیستم بطور اتوماتیک به صفحه اصلی برگشته و روی **LCD** زمان را نشان می دهد.

با استفاده از **Flash Memory** نصب شده در سیستم ، کلیه **Event** ها با زمان دقیق حادث شدن (دقت ۱۰ میلی ثانیه) ثبت می گردد، لذا این سیستم می تواند برای ورودیهای خود بعنوان یک **Event Recorder** نیز مورد استفاده قرار گیرد. همچنین در زمان نشان دادن آلام روی **LCD** میتوان وجود یا عدم وجود آلام را تشخیص داد.

سیستم TCS: با استفاده از کلیدها و یا کامپیوتر می توان سیستم را به عنوان **TCS** و آلام بطور همزمان تنظیم نمود . در این حالت ورودی های ۱ و ۲ و رله ۴ بعنوان **TCS** عمل می نمایند. که در این حالت کلیه وضعیت های **Circuit Breaker** و کنتاکت های **Trip Circuit** بر روی **LCD** نمایش داده خواهد شد. نحوه اتصال در پیوسته های فنی آمده است. به این ترتیب ۱۸ ورودی دیگر بعنوان ورودی آلام استفاده می شوند.

ماژول رابط Mlink20

جهت کنترل و مانیتور سیستم آلام ها از اطاق کنترل می توان کلیه سیستم ها را از طریق پورت RS485 به سیستم Data Collector(Mlink20) وصل کرده و سپس از طریق USB به کامپیوتر متصل نمود. (حداکثر تا ۲۰ سیستم) در این حالت با اجرای برنامه DataCollector روی PC به ازای هر سیستم آلام یک پنجره روی صفحه ظاهر خواهد شد. با انتخاب هر سیستم و استفاده از منوی setting می توان هر سیستم را تنظیم کرده و با انتخاب منوی State می توان وضعیت آن سیستم را مشاهده نمود .

در این حالت هنگامی که آلامی در هر سیستم وجود ندارد ، آن سیستم به صورت آبی رنگ بوده و به محض ورود آلام پنجره مربوط به آن سیستم به رنگ قرمز در آمده ، در صورتی که روی آن پنجره کلیک شود صفحه مربوط به آن آلام باز شده و مشخص می نماید کدام یک از ورودی ها دارای آلام می باشد.

در این حالت می توان در همین پنجره سیستم را Ack (Acknowledge) و یا Reset نمود.

در حالتی که سیستم به صورت TCS تعریف شده باشد (در این حالت ورودی های ۱ و ۲ جهت TCS استفاده می گردد) با باز کردن پنجره سیستم مربوطه در زیر صفحه حالت Circuit Breaker نمایش داده خواهد شد و اگر آلام TCS بیاید پنجره به رنگ زرد در خواهد آمد.

با اتصال خروجی Sync pin ماژول Mlink20 به ورودی ۲۰ سیستم آلام ها میتوان زمان را در کلیه سیستم ها همزمان نمود. همچنین با اتصال ورودی GPS ماژول Mlink20 به آنتن ، سیستم های آلام ، با ساعت جهانی همزمان خواهند شد. در صورتی که اتصال GPS قطع شود ، روی صفحه کامپیوتر پیغام قطع GPS ظاهر خواهد شد.

Specification

Digital Alarm Annunciator with event recorder (MAL20C)

- Five key control & 2x16 LCD
- Max 20 inputs for use with digital signals .
- Two group alarm classification with separate ground voltage.
- Each input accepts voltage signals from 85 V-180 V DC.
- Programmable 16 character LCD text for each alarm input.
- Alarms are displayed and scrolled up & down on LCD display.
- Time synchronization of all systems can be done with **GPS** through **Mlink20** interface box.
- Input delay programmable within the range of 10 ms to 600 s in steps of 10 ms for each input separately.
- Windows selectable dimension with indication of new and acknowledged alarms.
- Alarm inputs can be classified in urgent and nonurgent groups with separate output relays.
- Different frequency for first & second alarms.
- Inputs 1&2 can be defined as inputs for Trip Circuit Supervision (TCS) as a part of system .
- Operation with separate voltage references and separate output relays.
- LCD provides real time input sensing.



SOME TYPE OF MAL20C SYSTEM ALARM



MAL20C_8W



MAL20C_10W

SOME TYPE OF MAL20C SYSTEM ALARM



MAL20C_16W



MAL20C_20W

Specification

Digital Alarm Annunciator with event recorder (MAL20C)

- SD memory of 2G bytes for event logs with hijri date & time (unlimited).
 - RS485 interface for communication.
 - Standard MODBUS-RTU protocol.
 - PC based programming and reading of event logs, through **USB** link.
 - programming facility in the substation via USB port.
 - Central remote acknowledge and reset button.
 - Central monitoring and remote control on PC via **Mlink20** and RS485 port for up to 20 systems.
 - Provision of Excel log files on PC.
 - Self test and safety of output contact facility .
 - Power interruption alarm relay.
 - The last 20 alarms can be monitored on display with scrolling.
- **Additional Options**
 - Connection for time Sync. is shown in next pages(“connection of Mlink20 to system alarms”) and connection of External Ack. is shown in “External Acknowledge Connection” page.
 - Every system cab be define as one till 20 windows alarm system.



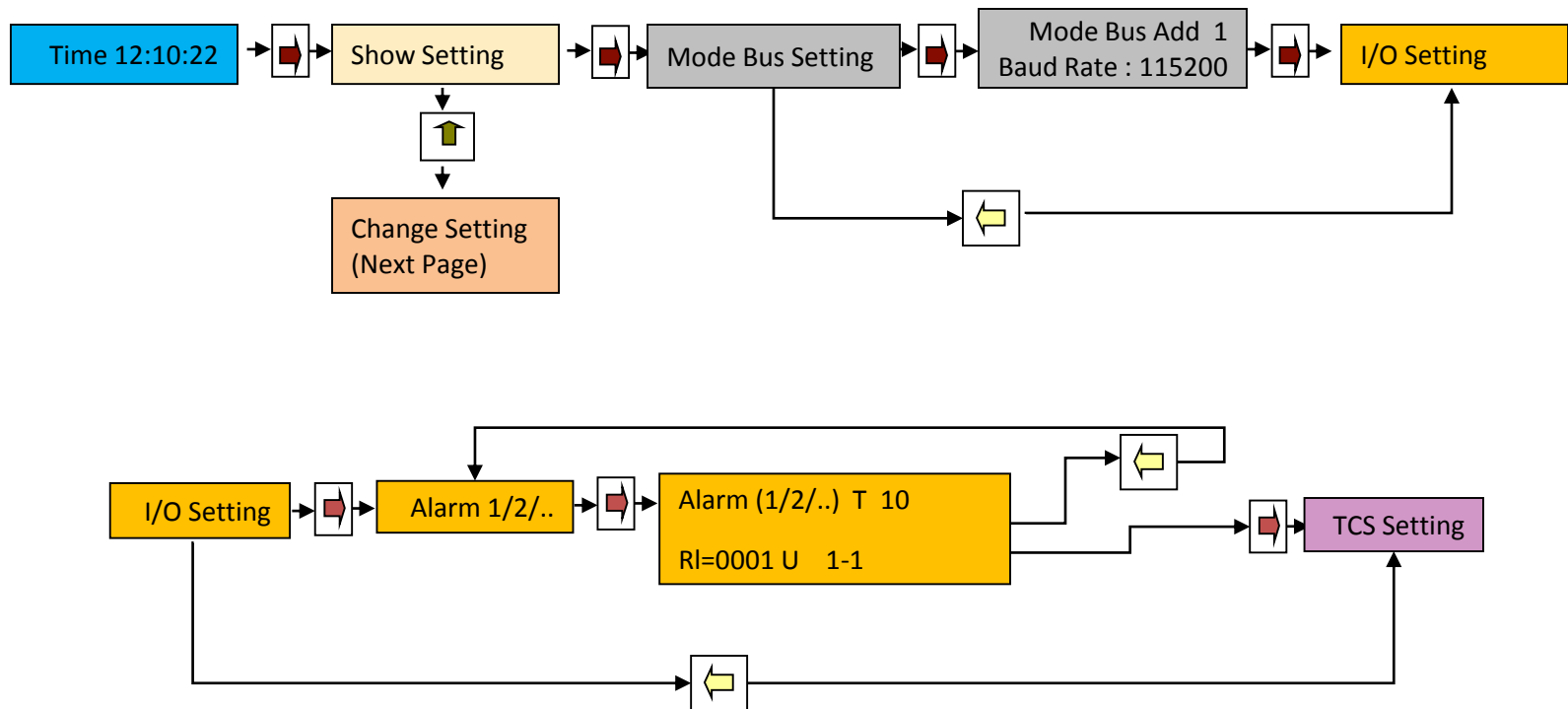
Specification

Digital Alarm Annunciator with event recorder (MAL20C)

- **Power consumption:** Max. 4 watts (Max. 37 mA at 110V dc).
- **Voltage supply:** 110V dc (50-180Vdc) .
Other supply voltages : By order.
- **Alarm Inputs :** **Maximum** 20 inputs organized in 2 categories (Urgent & Nonurgent) programmable.
- **Inputs delay:** 10 mSec. – 600 Sec in steps of 10 mSec.
- **Inputs voltage range:** 85V -180V DC . (At 110V dc , 1.2 mA current consump.) .
Other ranges : By order.
- **Outputs:** 2 changeover relays for alarms and one for TCS and one for self check , 5A, 240 VAC /30VDC contact. Each input can be set to one of or both output relays.
- **Windows:** Maximum 20 windows (Minimum 1) , each controlled by one alarm input.
- **Alarm annunciation:** Flashing window for new alarm, steady light for acknowledged alarm.
- **window flash frequency:** First alarm 4 Hz , second alarm 2 Hz others 1 Hz
- **LCD:** 2 x 16 characters with background light.
- **Programming:** From front panel keyboard and with PC (USB) .
- **Communication:** RS485 interface for connection up to 20 systems in Mlink20 or RTU .Monitoring and remote control can be done by PC.
- **GPS Setting:** Time synchronization of all systems can be done with GPS through **Mlink20**.
- **Protocol:** MODBUS-RTU.
- **Baud rate:** 9600, 19200. and 160kb per sec. only for Mlink20
- **Data bits:** 8
- **Stop bits:** 1
- **Show log: Calendar)** Display last 20 alarms with date and time , on LCD. **Date in Iranian Calendar (Solar Jalali**
- **SD memory:** 2G bytes for event logs with date & time in msec (unlimited).
- **PC based programming:** Reading of event logs , through USB link.
- **Inputs 1&2:** Can be defined as inputs for trip circuit supervision as a part of system operation with separate voltage references
- **Operating temperature:** -10 to +55°C
- **Storage temperature:** -20 to +70°C
- **Humidity:** 93% RH at 20°C
- **Approvals:** Certified by EPIL according to standard , IEC61839-1-3
- **Weight:** 0.8kg
- **Dimensions:** 148 x 104 x 134mm (H x W x D)
- **Panel cut out:** 154 x 108mm

Characteristics

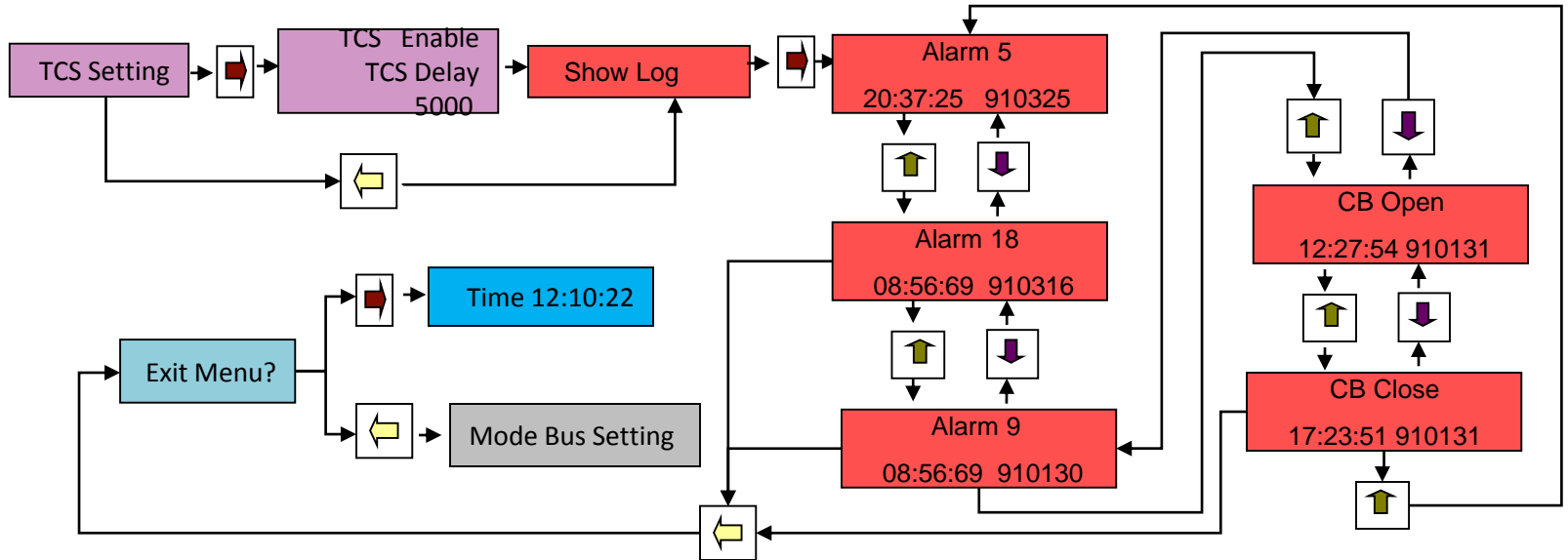
Show SETTING MENU



Note: In each position in setting menus , the system goes to normal condition by push the RST key.

Characteristics

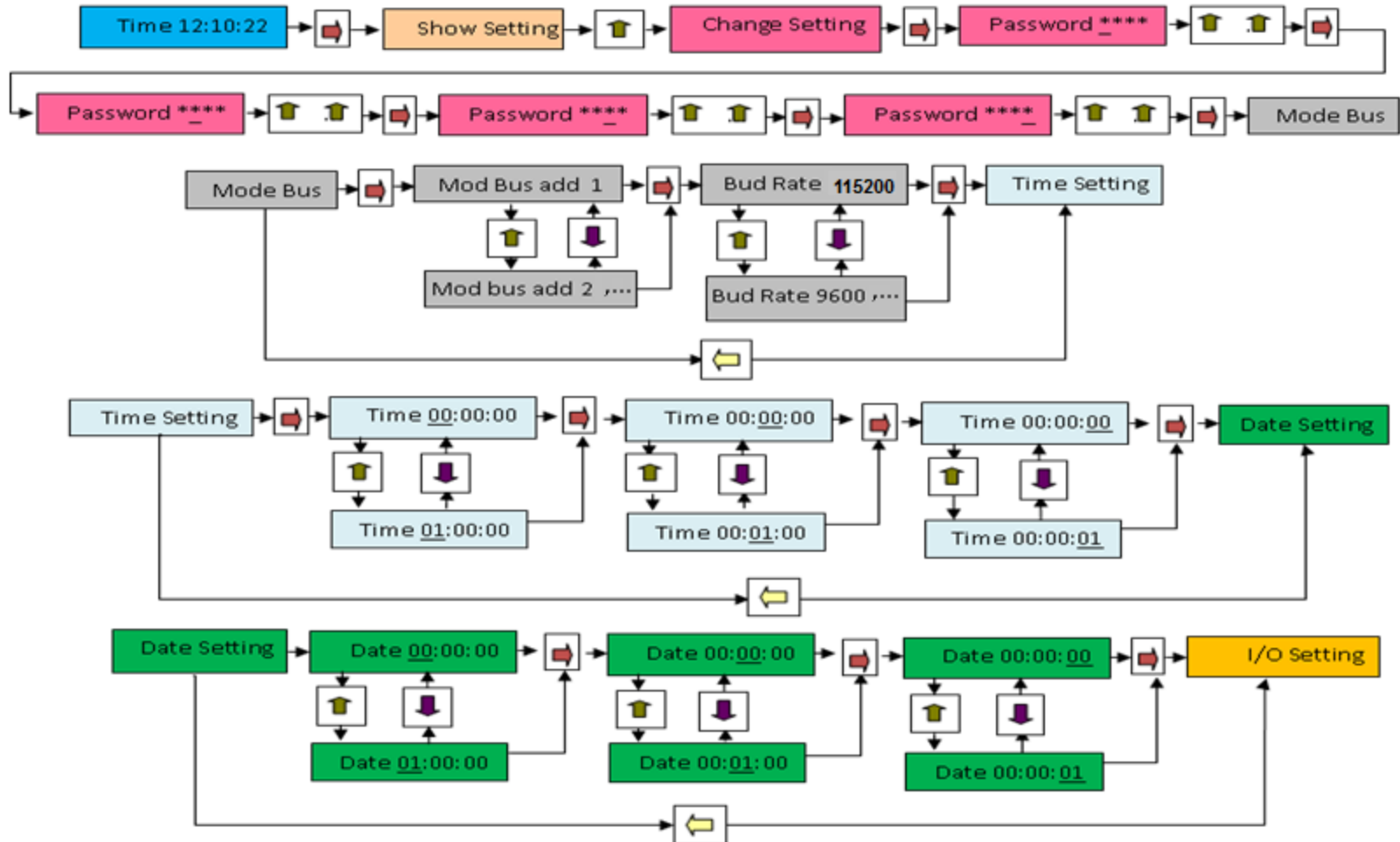
Show SETTING MENU continue



Characteristics

CHANGE SETTING MENU

Default Password is "0000"

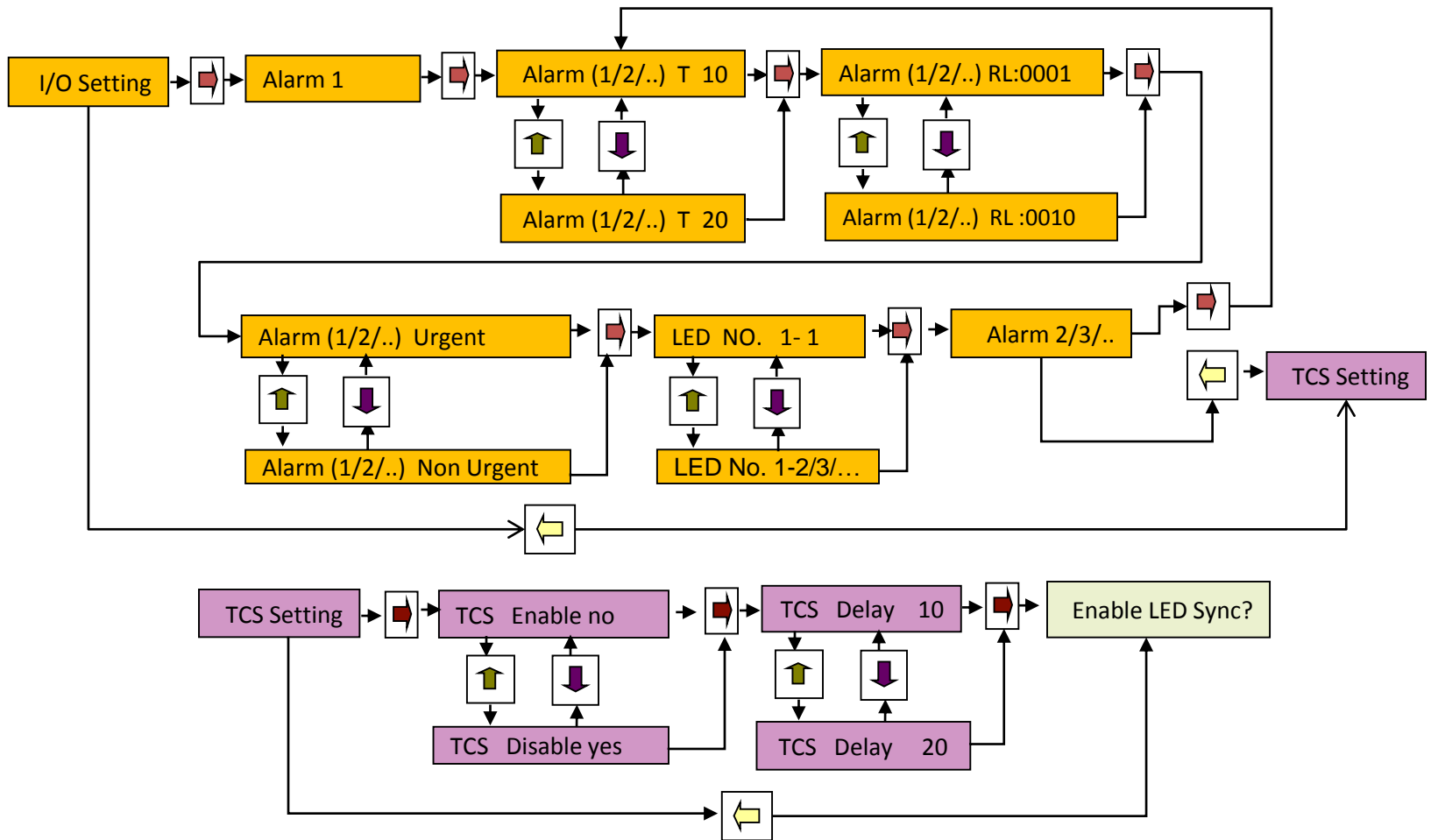




Characteristics

Important Note :
Reset the system after
change the alarm setting.

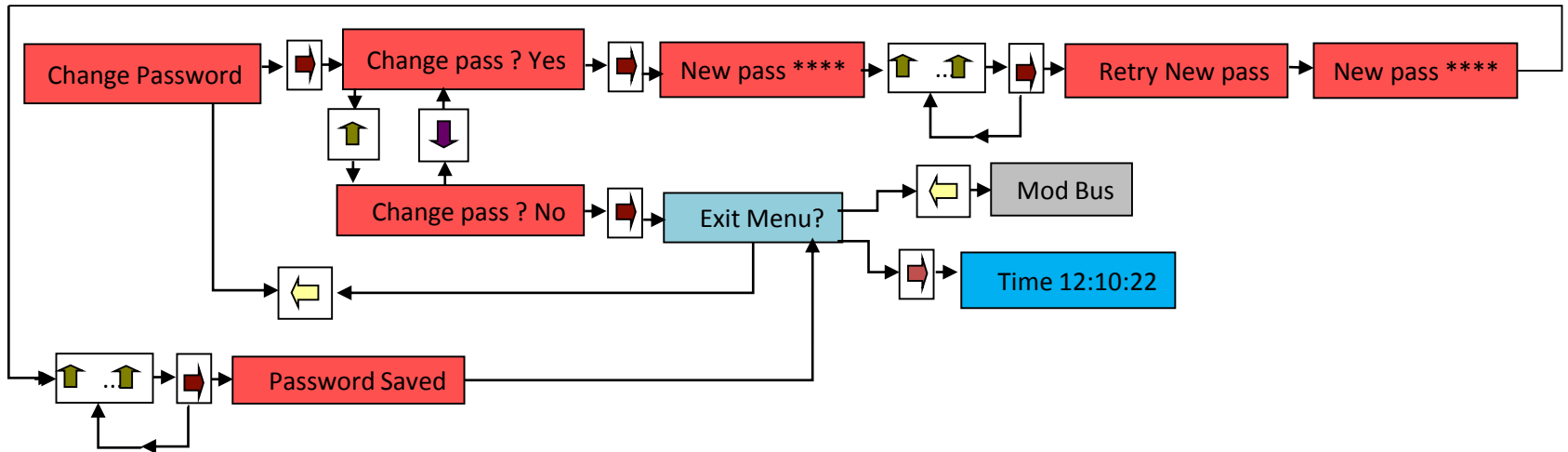
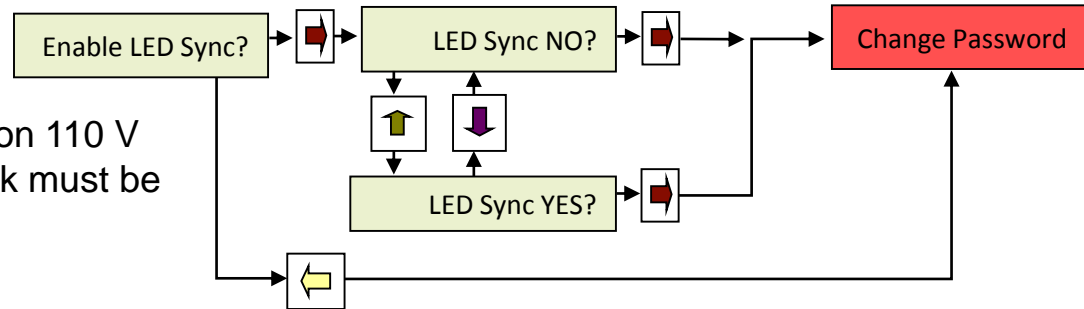
CHANGE SETTING MENU continue



Characteristics

CHANGE SETTING MENU continue

In LED Sync. Condition 110 V and Sync. Pin of Mlink must be connected.




Setting of systems


- Mode Bus
 - Mode Bus Add
 - Can be set from 1 to 20
 - Baud Rate
 - 9600 , 19200 ,115200
- Time Setting
 - hh:mm:ss
- Date Setting
 - yy:mm:dd enter in Christian calendar the system automatically shows in solar calendar
- I/O Setting
 - Alarm Setting
 - Delay time Setting 10 msec to 600 sec , Alarm relay setting 1st or 2nd or both relays
 - Urgent / Non Urgent , LED No. x x+ 1 till 5 .
- TCS Setting
 - Disable or Enable and TCS delay time 10msec to 100 msec
- GPS Sync Setting
 - Enable or disable (Enabling this, needs input 20 to be connected to Mlink20)

Programming and setting via USB

The **USB** port for alarm setting or data collection by a laptop or computer .

Connect system to PC or laptop with USB cable.

Run setup.exe program in Alarm MAL20C directory in CD. In this condition Alarm icon appears on desktop () .

Then run Alarm program  on PC you will have off line menu (fig 1), by enable on line box you will have the condition of system alarm (fig 2).

There are three subwindows (Status , Setting & Log)

Status of Alarms on PC or laptop.

In Status menu the condition of any alarms can be checked in laptop or PC.

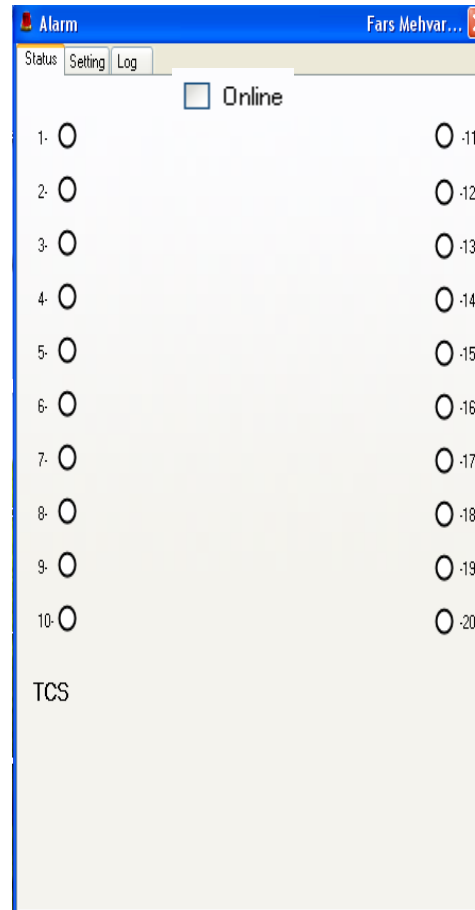


Fig 1

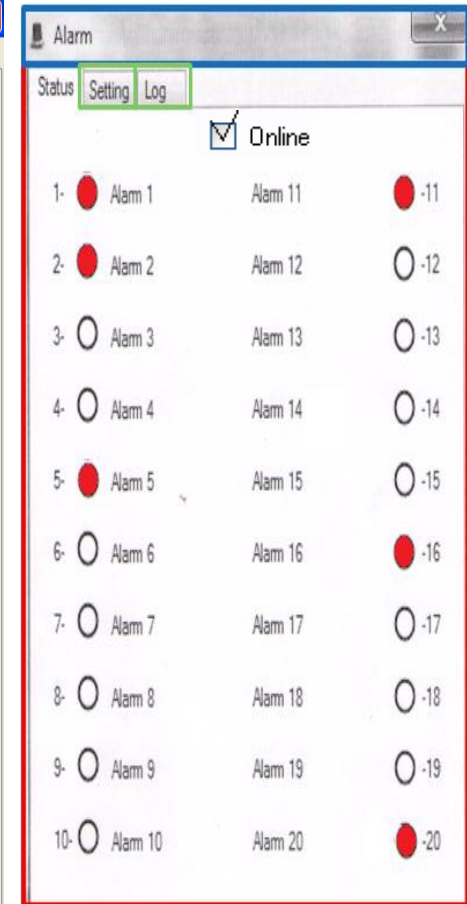


Fig 2

Programming and setting via USB

(continued)

The **USB** port for alarm setting or data collection by a laptop or computer .

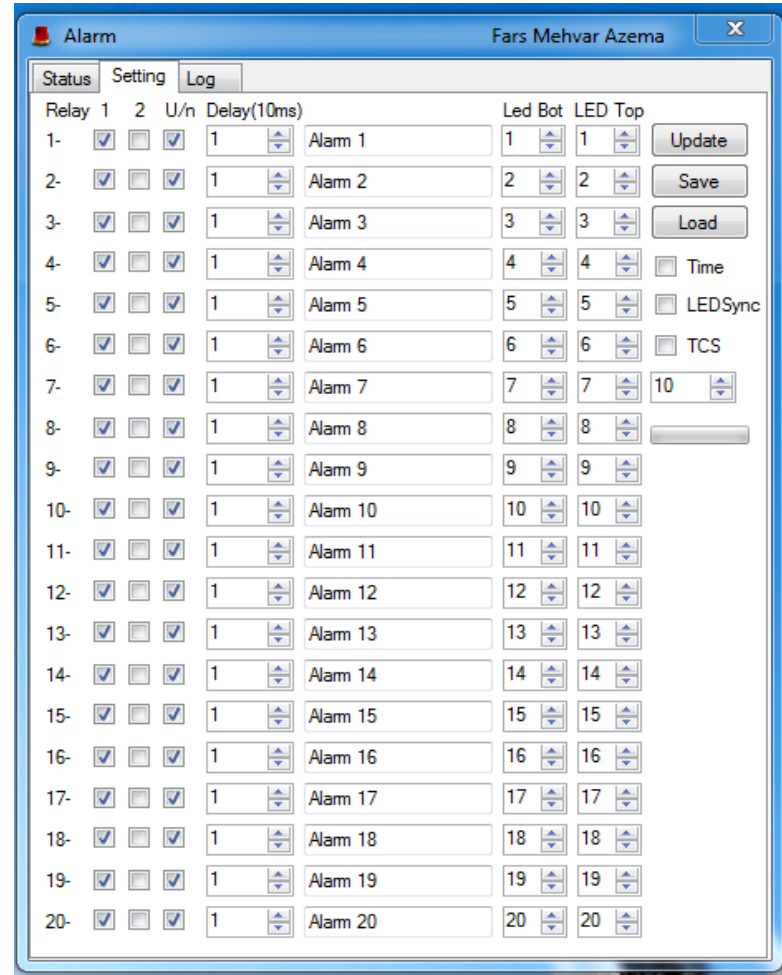
Table for **setting** Alarms with use PC or laptop

The following setting can be done from this menu:

- Assigning of output relays (1-2) to inputs(1-20)
- Defining the time delay for inputs(1-20).
- Defining a (1-16) characters text for any of input alarms(1-20).
- The system's time can be updated and time adjusted to the time of laptop or PC.
- activate or deactivate the TCS operation.
- The delay that should be consider for Circuit Breaker during TCS operation.
- Setting the dimension of windows for every input alarms by No. of LED Bot and LED Top.

Important Note :

Reset the system after change the alarm setting.



Relay	1	2	U/n	Delay(10ms)	Alarm	Led Bot	LED Top	
1-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 1	1	1	Update
2-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 2	2	2	Save
3-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 3	3	3	Load
4-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 4	4	4	<input type="checkbox"/> Time
5-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 5	5	5	<input type="checkbox"/> LED Sync
6-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 6	6	6	<input type="checkbox"/> TCS
7-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 7	7	7	10
8-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 8	8	8	
9-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 9	9	9	
10-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 10	10	10	
11-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 11	11	11	
12-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 12	12	12	
13-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 13	13	13	
14-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 14	14	14	
15-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 15	15	15	
16-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 16	16	16	
17-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 17	17	17	
18-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 18	18	18	
19-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 19	19	19	
20-	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1	Alarm 20	20	20	

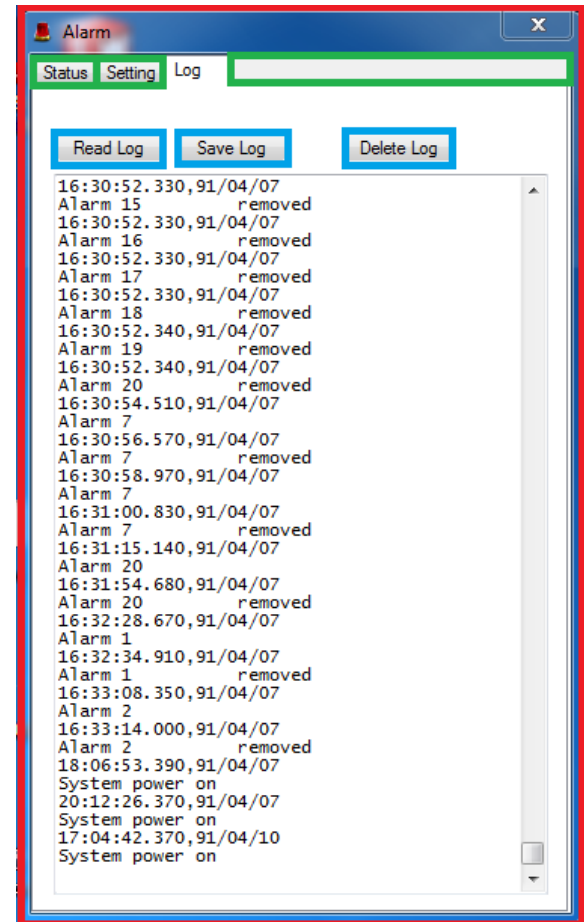
Programming and setting via USB (continue)

The **USB** port for alarm setting or data collection by a laptop or computer .

Table for Showing **log** Alarms with use PC or laptop

The system can operate as an **event recorder** for it's inputs.

During event recording or data transfer, the alarms can be reported by their description or their number.





Programming and setting via USB

(continued)

The **USB** port for alarm setting or data collection by a laptop or computer .

Transfer log file to Excel for analyze

16:30:52.32.	91-04-07	Alarm 8	removed
16:30:52.32.	91-04-07	Alarm 9	removed
16:30:52.32.	91-04-07	Alarm 10	removed
16:30:52.32.	91-04-07	Alarm 11	removed
16:30:52.32.	91-04-07	Alarm 12	removed
16:30:52.32.	91-04-07	Alarm 13	removed
16:30:52.33.	91-04-07	Alarm 14	removed
16:30:52.33.	91-04-07	Alarm 15	removed
16:30:52.33.	91-04-07	Alarm 16	removed
16:30:52.33.	91-04-07	Alarm 17	removed
16:30:52.33.	91-04-07	Alarm 18	removed
16:30:52.34.	91-04-07	Alarm 19	removed
16:30:52.34.	91-04-07	Alarm 20	removed
16:30:54.51.	91-04-07	Alarm 7	
16:30:56.57.	91-04-07	Alarm 7	removed
16:30:58.97.	91-04-07	Alarm 7	
16:31:00.83.	91-04-07	Alarm 7	removed
16:31:15.14.	91-04-07	Alarm 20	
16:31:54.68.	91-04-07	Alarm 20	removed
16:32:28.67.	91-04-07	Alarm 1	
16:32:34.91.	91-04-07	Alarm 1	removed
16:33:08.35.	91-04-07	Alarm 2	
16:33:14.00.	91-04-07	Alarm 2	removed
18:06:53.39.	91-04-07	System power on	
20:12:26.37.	91-04-07	System power on	
17:04:42.37.	91-04-10	System power on	

Programming and control via RS485

The **RS485** is intended for long distance bus communication between multiple units.

For example can be used for RTU connection .

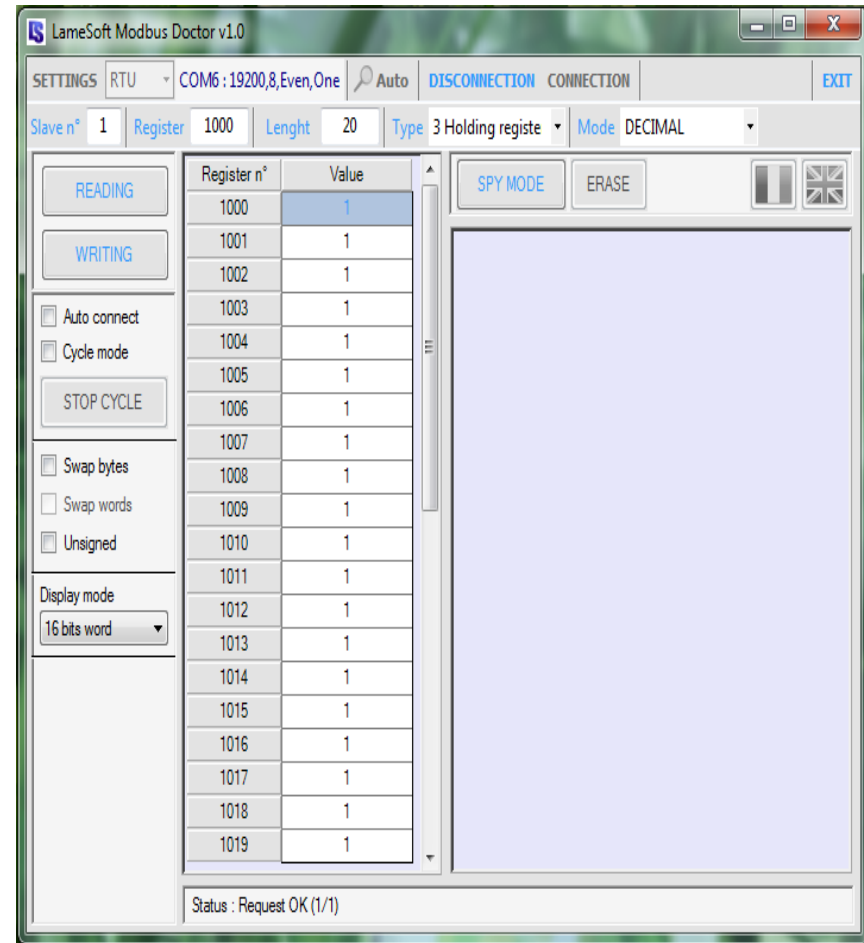
RTU can support standard protocols

([Modbus](#), [IEC60870-5 -101/103/104](#), [DNP3](#), [IEC 60870-6-ICCP](#), [IEC 61850](#) etc.) to interface any third party software.

Connect system to PC from RS485 terminal then run **ModbusDoctor** program , you will have this window. In this window, set RTU , COM port and register number , click on connection part .Now you can read or write between PC and system.

Some systems can be connected together and send data to master device .

In this window register 1000 defined for time delay of alarms. Slave NO. 1 has sent delay time of all alarms to master.



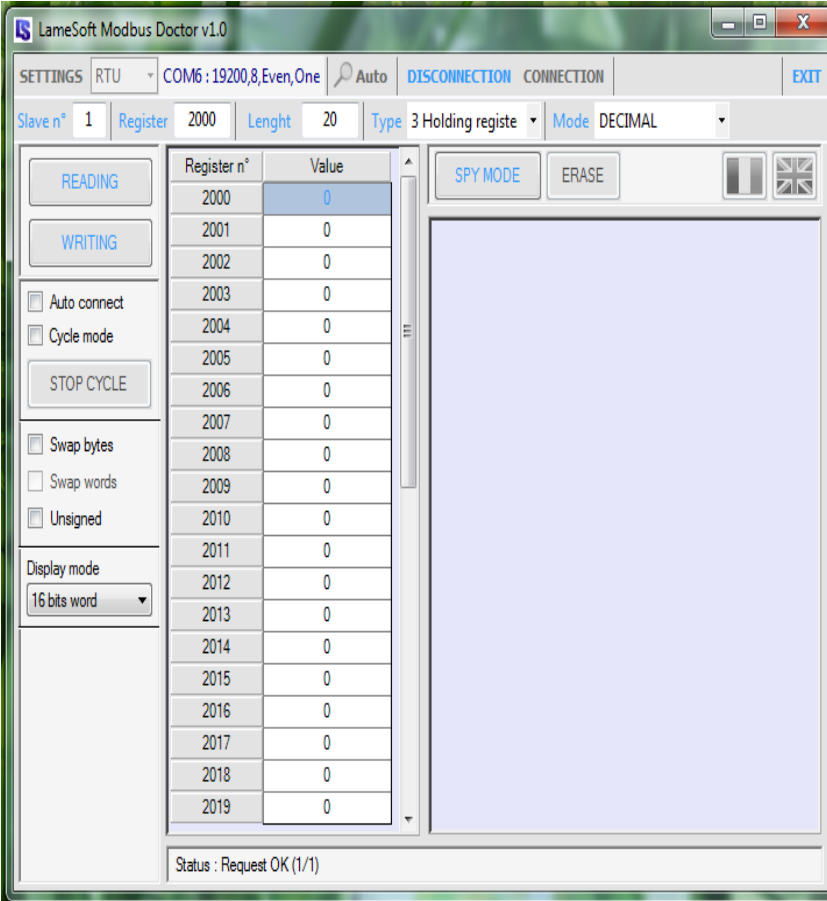
Programming and control via RS485 (continued)

The **RS485** is intended for long distance bus communication between multiple units.

In this RTU window :

Register 2000 is assigned to send condition of input alarms to master device.

In column value “ 0” shows no alarm and “1” shows alarm condition.



The screenshot shows the LameSoft Modbus Doctor v1.0 interface. The main window displays a table of registers with the following data:

Register n°	Value
2000	0
2001	0
2002	0
2003	0
2004	0
2005	0
2006	0
2007	0
2008	0
2009	0
2010	0
2011	0
2012	0
2013	0
2014	0
2015	0
2016	0
2017	0
2018	0
2019	0

The interface also includes a left sidebar with buttons for 'READING' and 'WRITING', and checkboxes for 'Auto connect', 'Cycle mode', 'Swap bytes', 'Swap words', and 'Unsigned'. A 'STOP CYCLE' button is also present. The status bar at the bottom indicates 'Status : Request OK (1/1)'.

Programming and control via RS485 (continued)

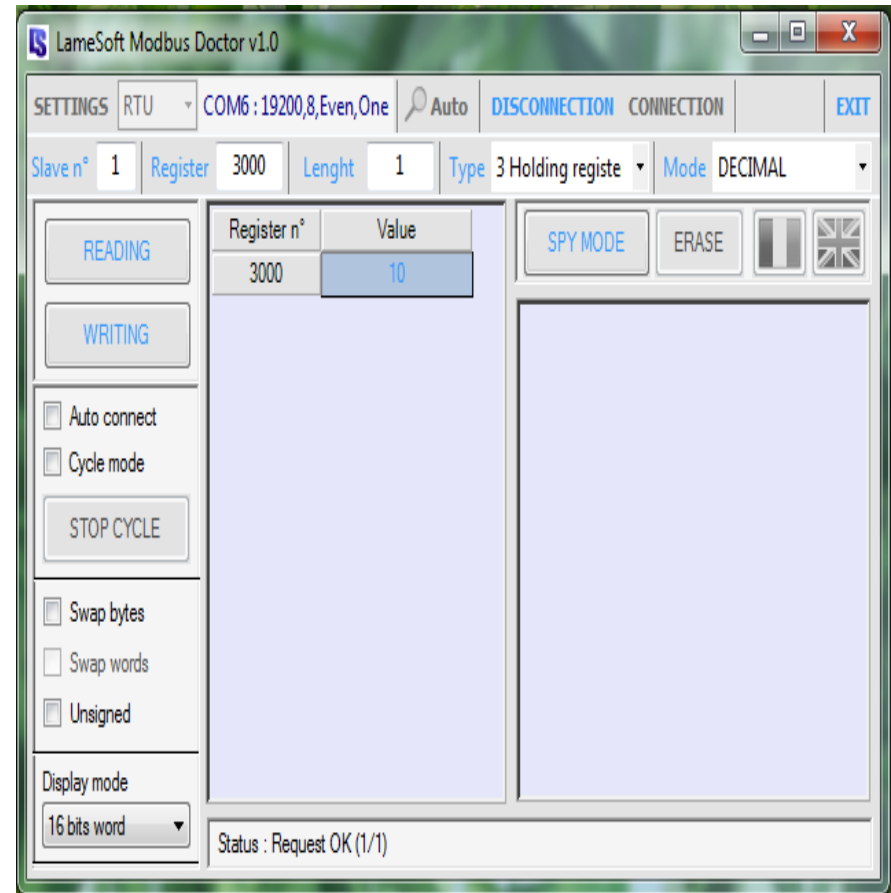
The **RS485** is intended for long distance bus communication between multiple units.

In this RTU window :

Register 3000 is defined to show C.B. time delay when TCS is active .

The time is shown as multiples of 10ms ,
in here 10 means 100 ms.

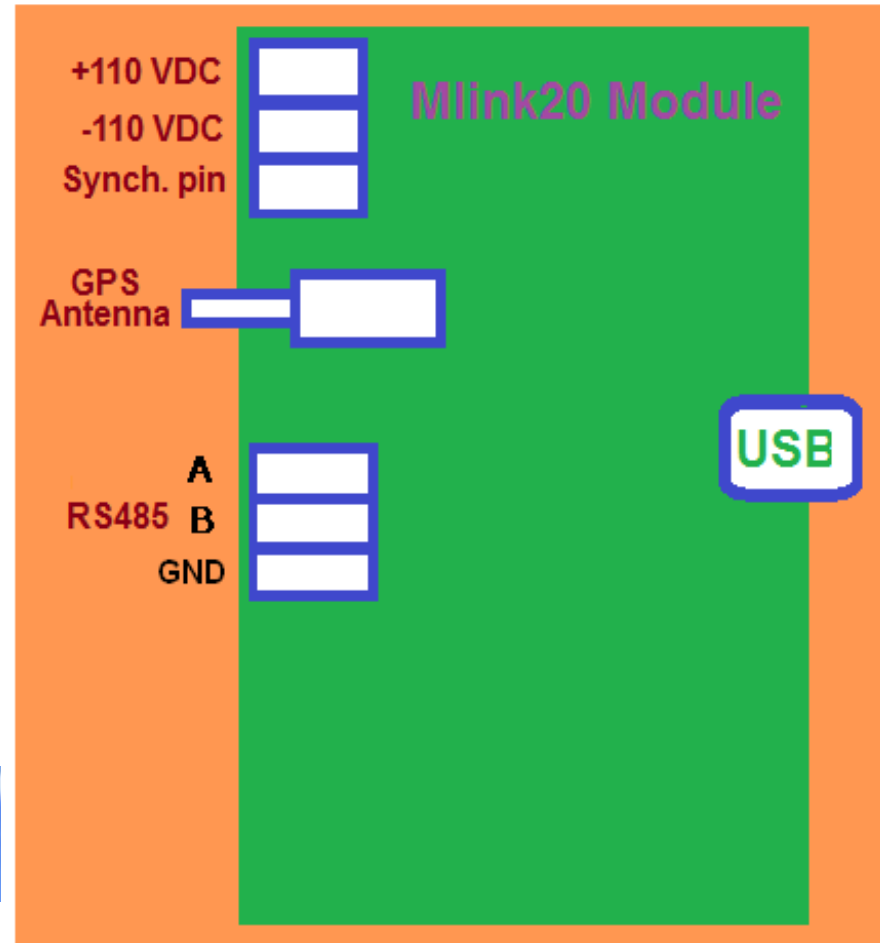
This program Is used for test RS485 port.



Alarms data collection & monitoring on PC

Mlink20 (Alarm data collector) (optional)

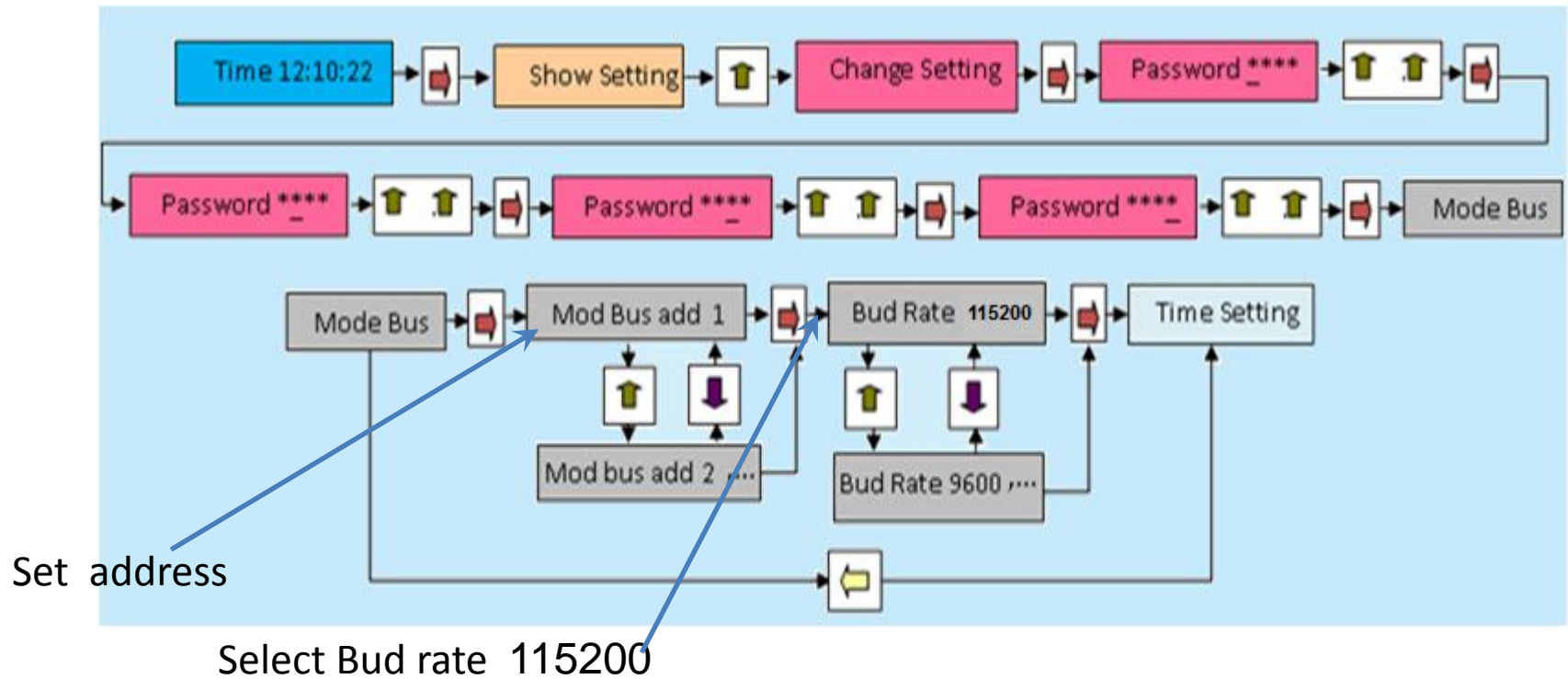
- This is interface Module between alarm Systems and PC also input connection of GPS for time synchronizing of all systems.
- This module connects to all systems via RS485
- When using RS485 port ,a 120 ohm termination resistor should be connected between terminals A and B of the last system.
- For connecting alarm systems to Mlink20, set the baud rate of the systems to 160kbps.(The factory setting)
- Use only shielded twisted pair cable for RS485 connections.
- Up to 20 systems can be define and control via Mlink20 by PC in control room.
- Run setup.exe program in Data Alarm Collector directory in CD . In this condition Alarm data Collector icon appears on desktop.



Alarms data collection & monitoring on PC_(continued)

Sequence for use Mlink20 (Alarm data collector):

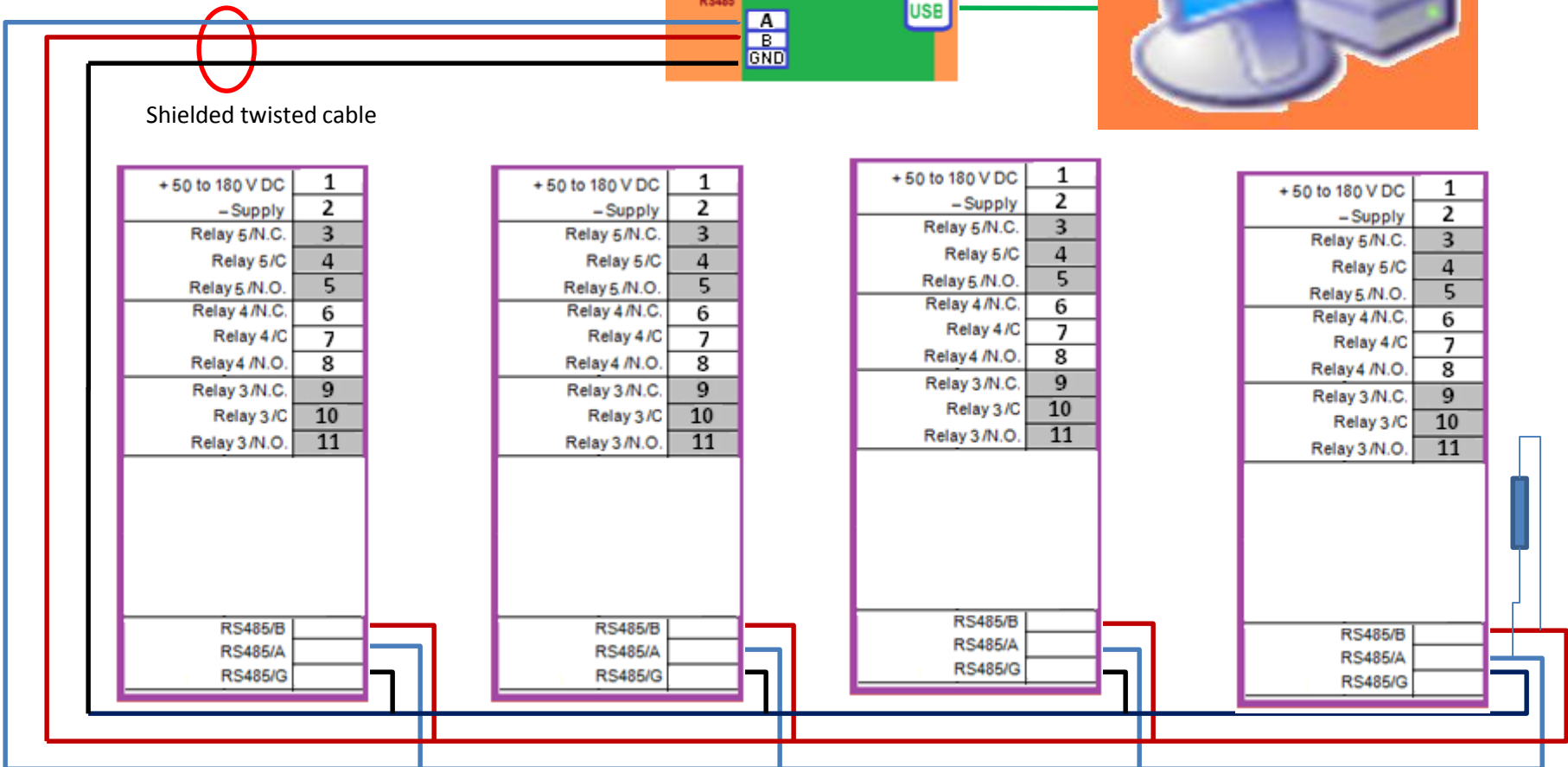
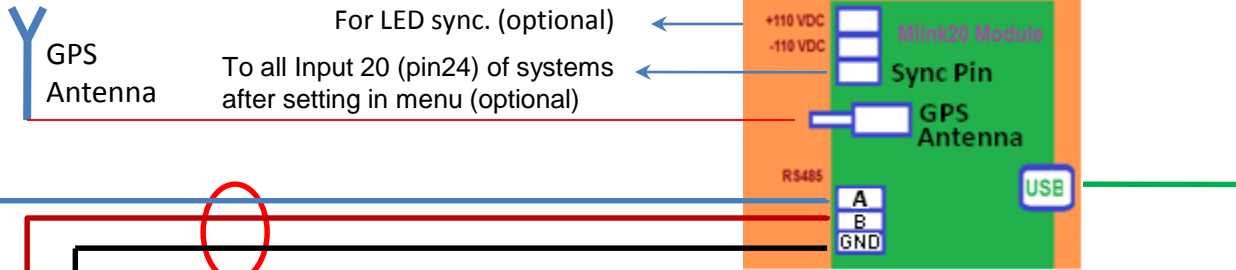
1) Set the address and bud rate of every system



2) Connect the systems and Mlink20 and PC .

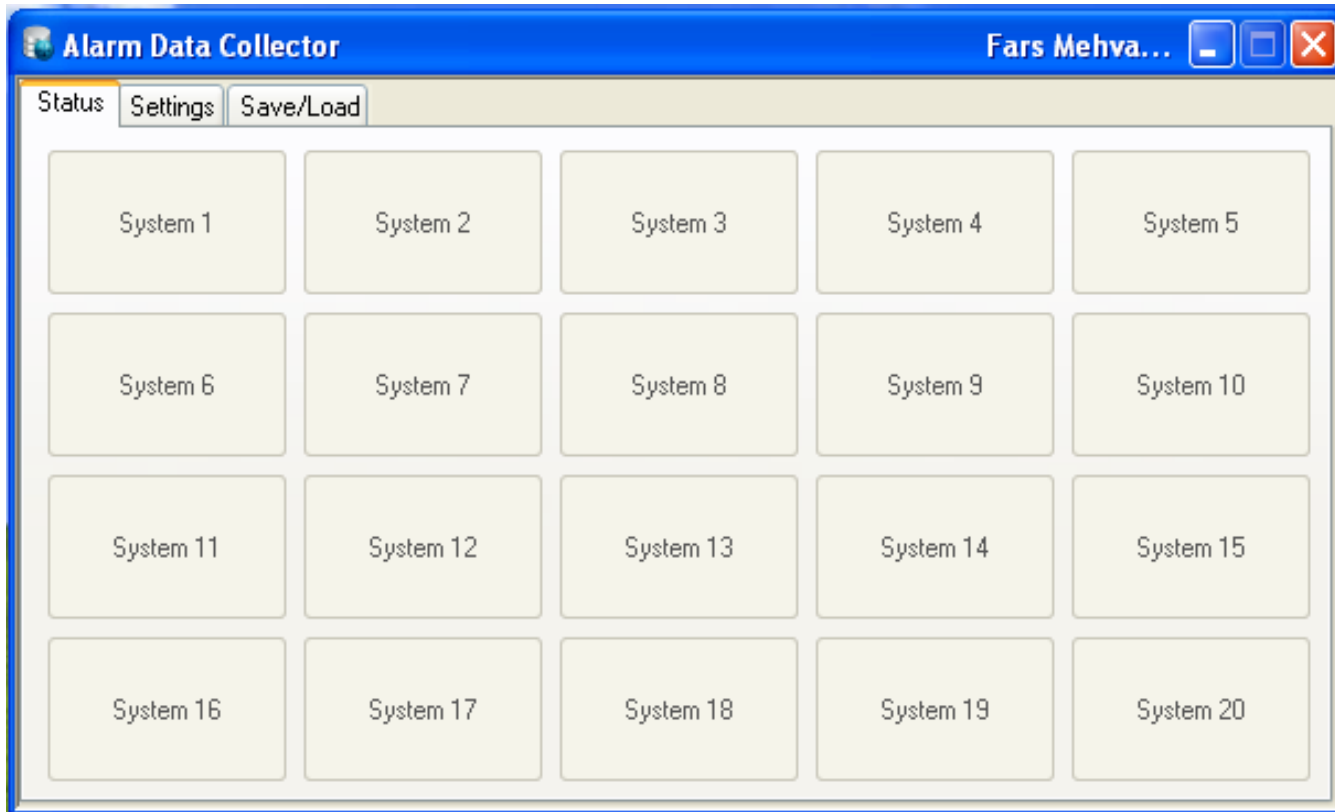
Alarms data collection & monitoring on PC (continued)

Connection the Mlink20 (Alarm data collector) (optional)



Alarms data collection & monitoring on PC_(continued)

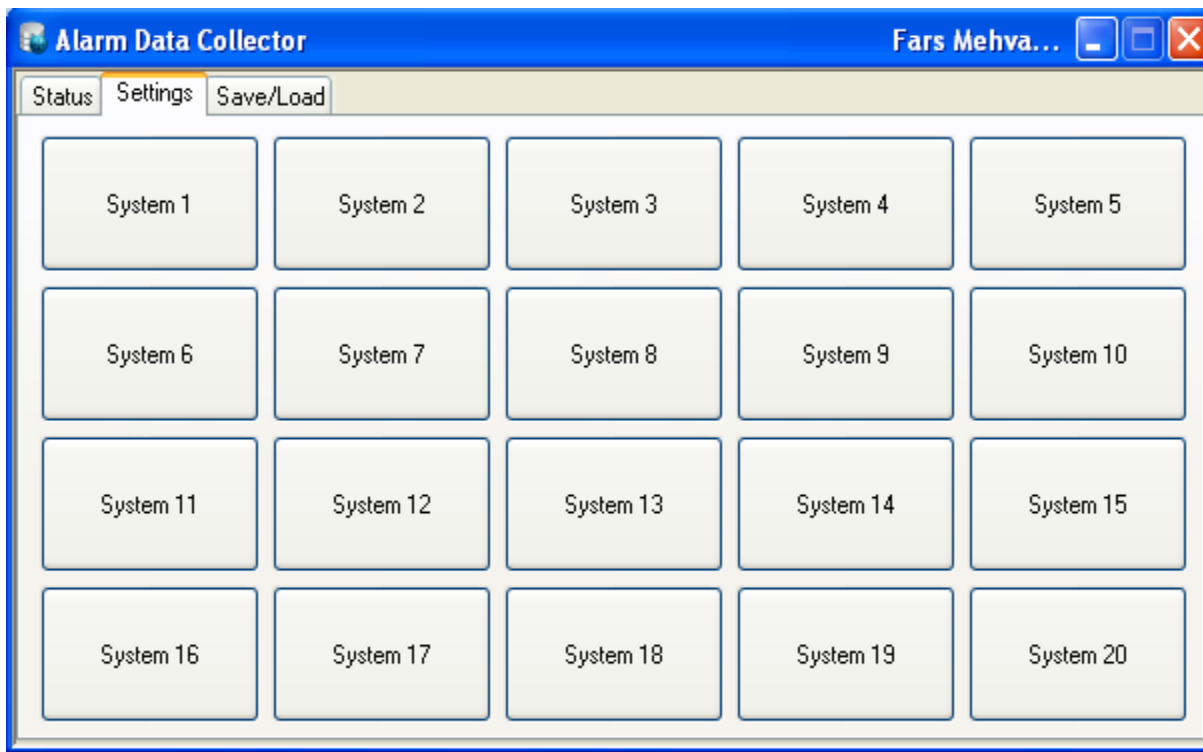
- 3) Run the “ Alarm Data Collector” program in PC , the below window appear .
Up to 20 systems can be define and control via Mlink20 by PC in control room.



Alarms data collection & monitoring on PC_(continued)

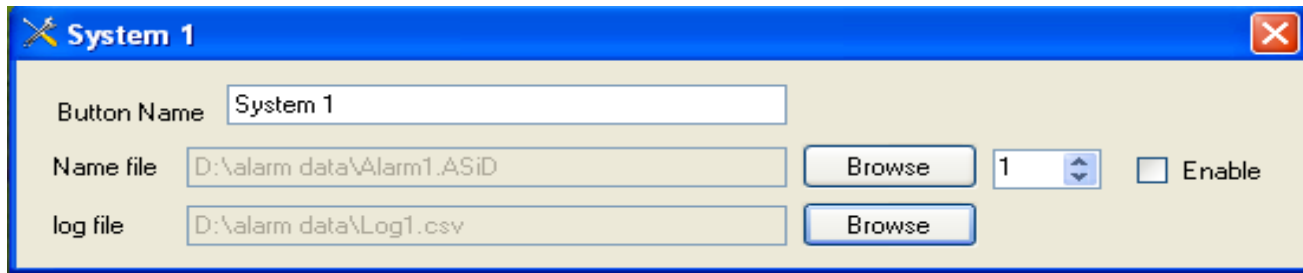
Settings window

4) Select the Settings window.



Alarms data collection & monitoring on PC_(continued)

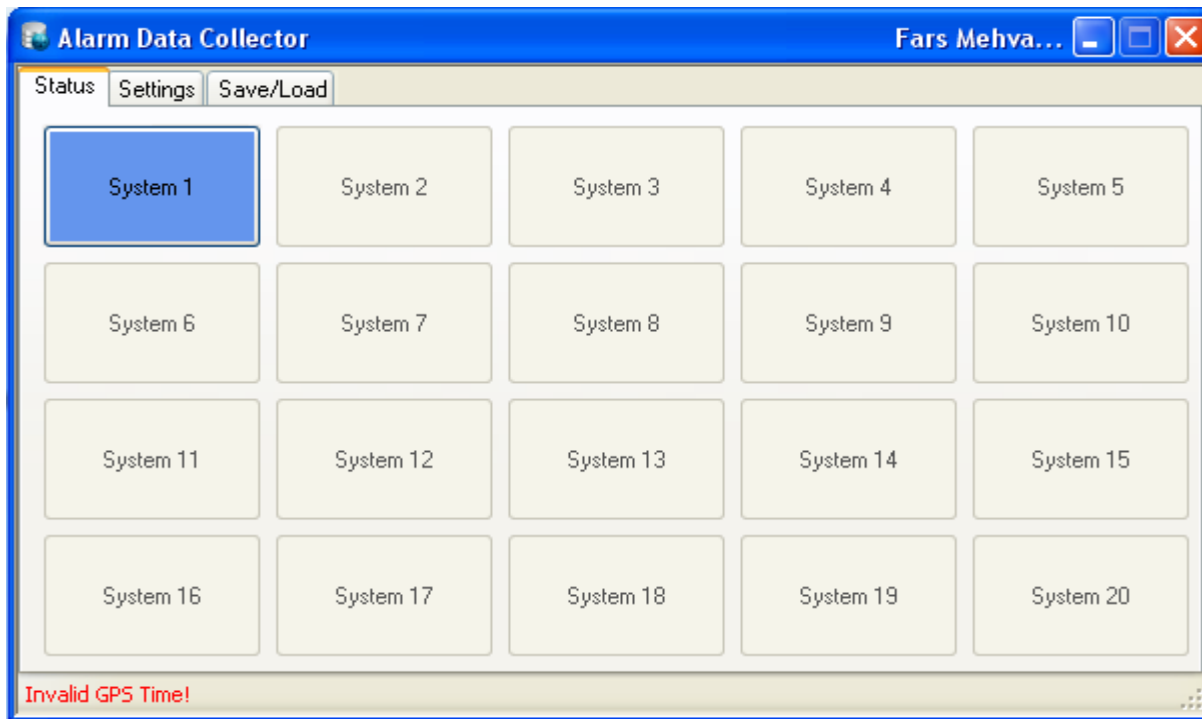
Click on system 1 , the below window appear .



- 5) On this window set the Name file with extension ASiD and Log file with extension csv (you can use a Log file for every system. This Log file can be used for analysis the events).
Set the address of system (for example 1).
Enable it .
At the end close this window.
- 6) Click on next system and do all above for it (use the address for example 2 for this one) , Enable it and close the window.
- 7) After programming of all systems , set the Status .

Alarms data collection & monitoring on PC_(continued)

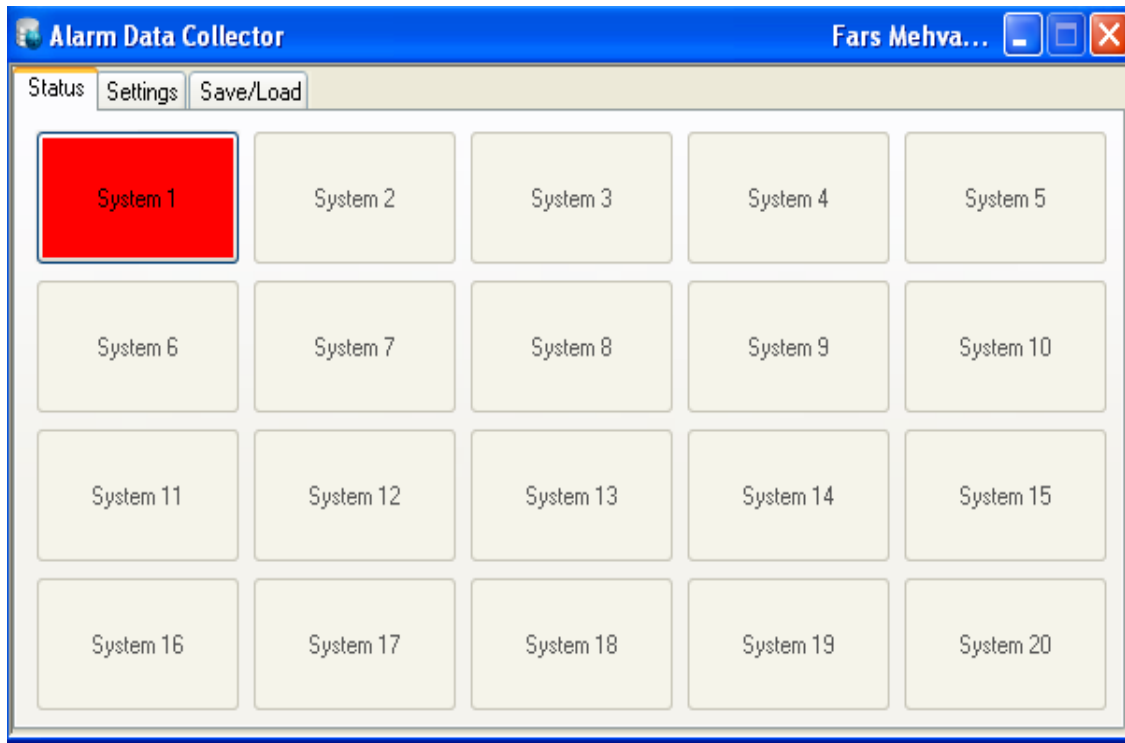
8) In status menu the condition of every system can be monitor in control room. When there are not any alarm the color of systems are blue and in alarm or fault condition the color changes to red. (In no connection of GPS there is **Invalid GPS Time** comment in window)



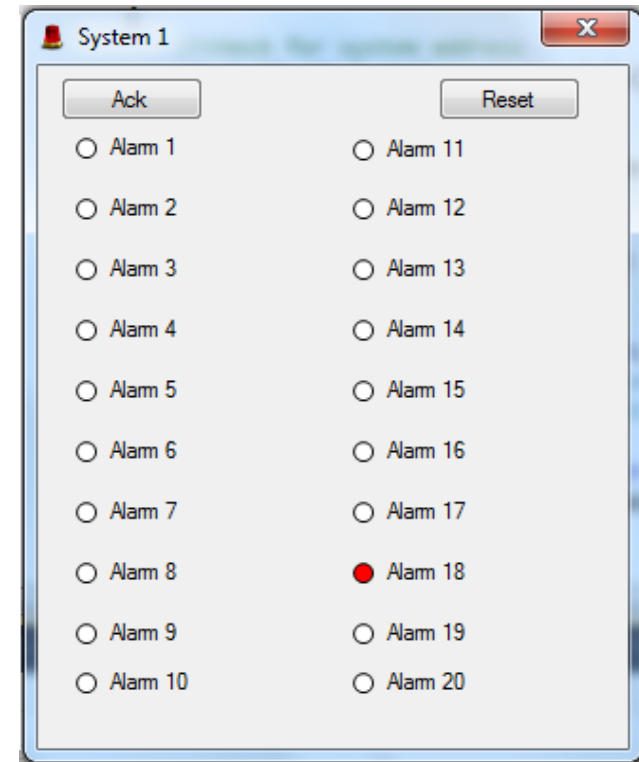
Alarm panel in safe condition

Alarms data collection & monitoring on PC_(continued)

In alarm condition (red) , by clicking on system the status of it can be checked (which one of 20 inputs enable?) in this condition by select Ack (acknowledge) or Reset box , the active alarm can be knowledge and reset.



Alarm panel in fault condition



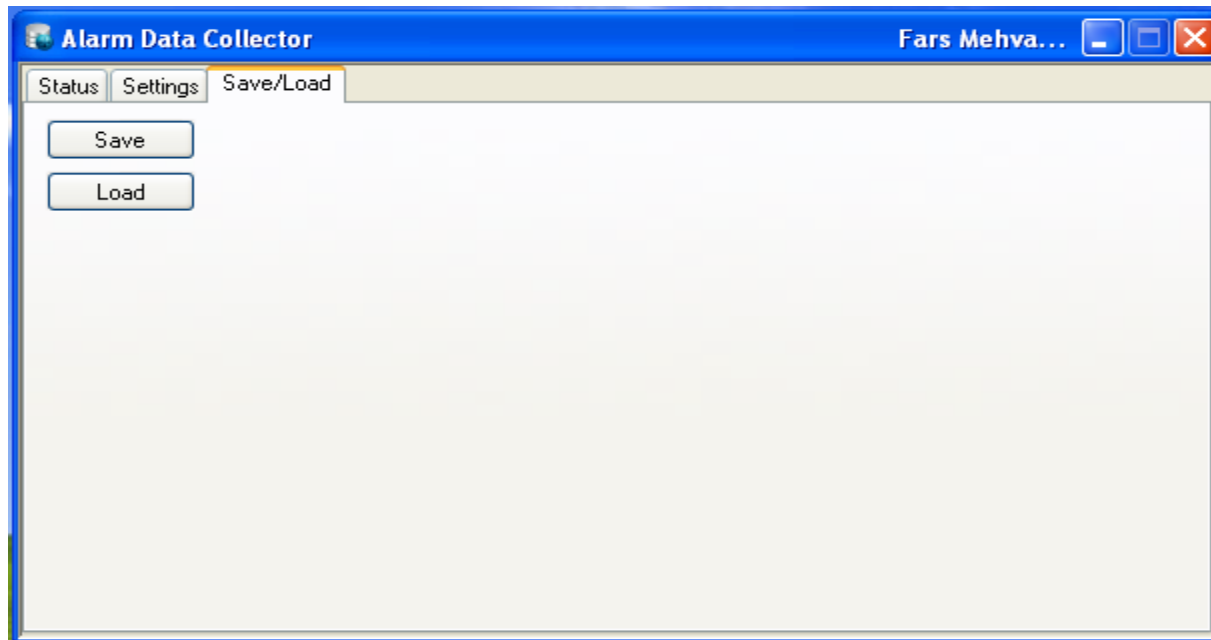
Select system 1 alarm

Alarms data collection & monitoring on PC_(continued)

Save and Load the Setting

At the end of settings , it can be saved .

For saving the settings select the save/load window , the below window appear.



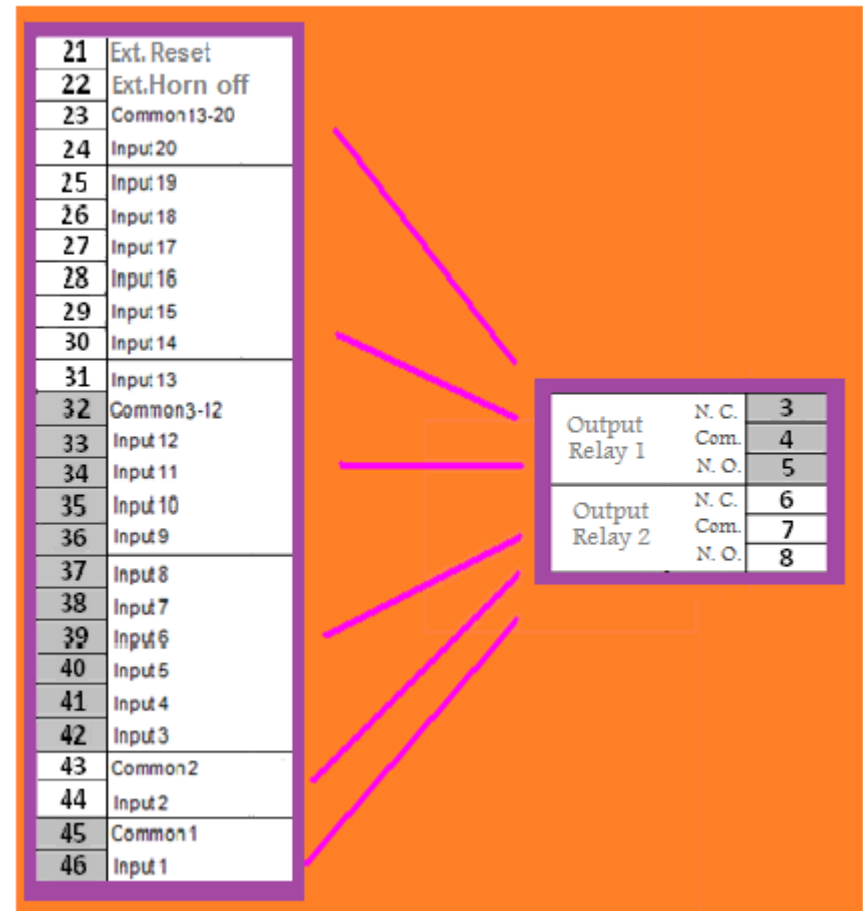
With click on Save , the settings will be saved .

By saving the file in " My documents " setting will be loaded automatically with running the Alarm Data Collector program.

The saved setting can be loaded by clicking on Load window.

Function (Alarm)

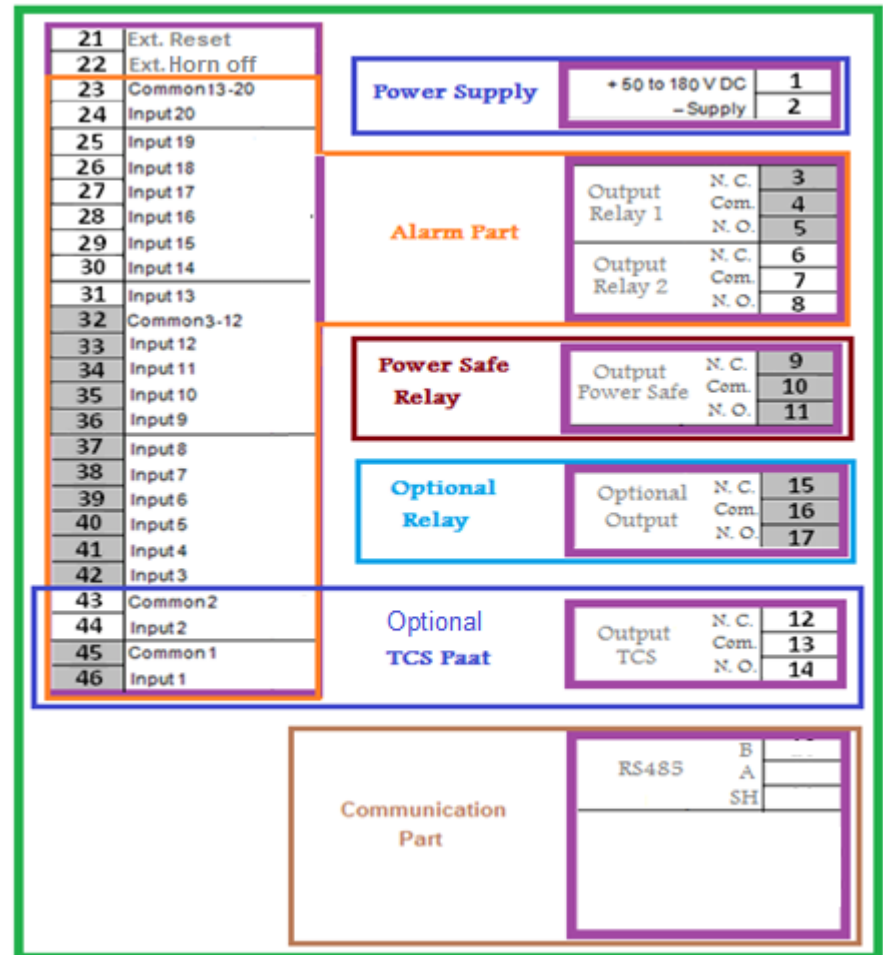
The MAL 20C features a total of 20 programmable alarms. Multiple alarms can be assigned to the same input group to provide annunciation at different input selectable delays. An alarm is annunciated when the input passes above or below a fixed level.



Function(TCS & Alarm)

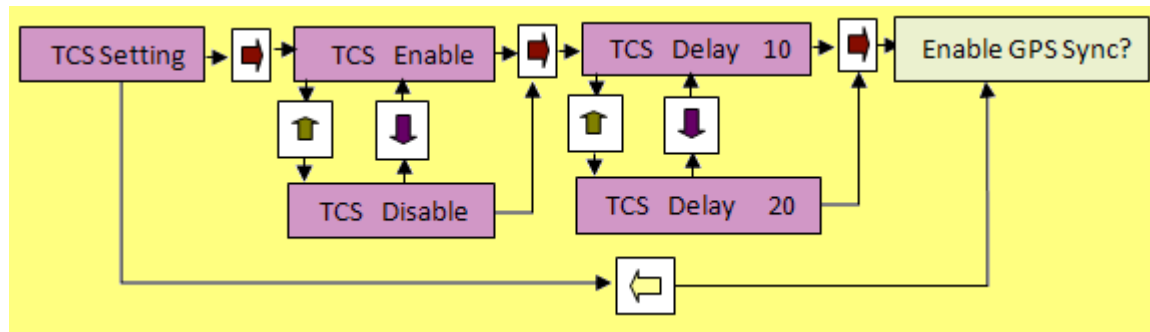
The MAL 20C features a total of 18 programmable alarms and TCS . Multiple alarms can be assigned to the same input group to provide annunciation at different input selectable delays. An alarm is annunciated when the input passes above or below a fixed level.

There are Safety Relay output for ensure proper functioning of the system.

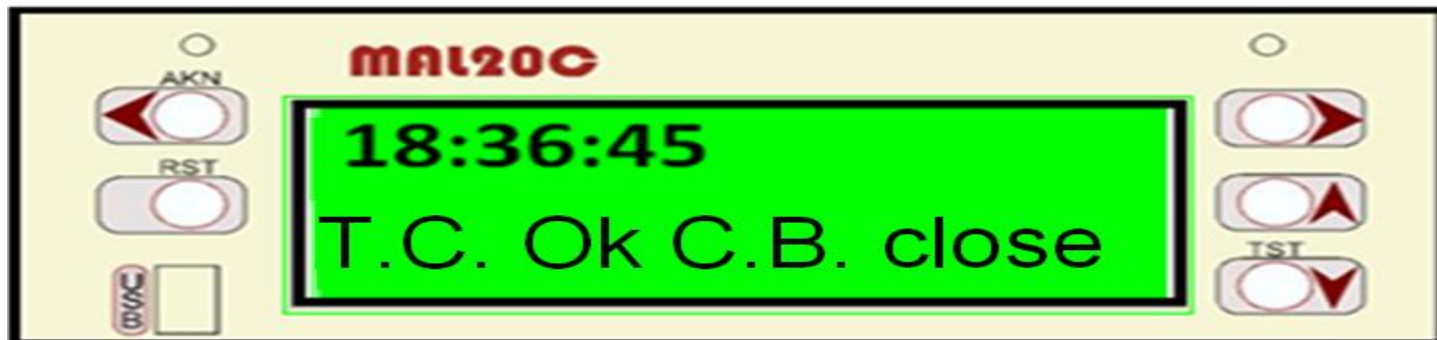


TCS Operation

- For Enable TCS , in programming menu select TCS Setting , in this part we can Enable the TCS and set the TCS delay (the time which Circuit Breaker needs to go to open condition)



- After setting TCS there are in LCD :



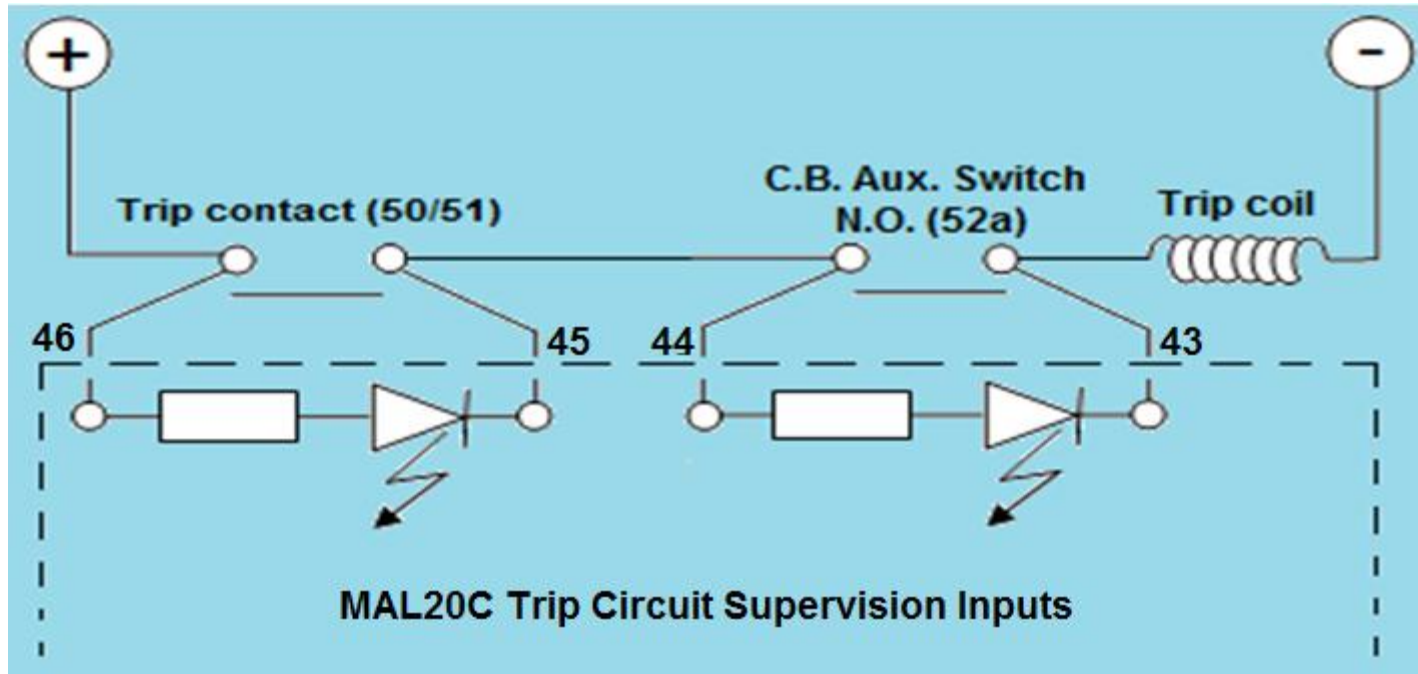


TCS Operation (Continue)

Input 1	Input 2	State	LCD Message	LED1	LED2	Siren
Open	Close	Normal State	T. C. OK C. B. Close	Off	Off	Off
Close	Close	Before C. B. Defined Delay	OK	Off	Off	Off
Close	Close	After C. B. Defined Delay	T. C. Fail / Timeout Trip / C. B. Close	Off	Blink	On
Open	Close	After C. B. Defined Delay	T. C. Fail / Timeout Trip / C. B. Close	Off	Blink	On
Open	Open	After C. B. Timeout	C. B. Timeout 441 (Delay in operation in msec) No Trip / C. B. Open	Blink	Blink	On
Open	Close		C. B. Timeout 441 (Delay in operation in msec) No Trip / C. B. Close	On	On	On
Open	Close	After Ack (Siren Off)	C. B. Timeout 441 (Delay in operation in msec) No Trip / C. B. Close	On	On	Off
Open	Close	After Reset(Both LED Off) Goes on Normal State	18:23:45 T. C. OK C. B. Close	Off	OFF	Off

TCS Operation (Continue)

TCS Connection



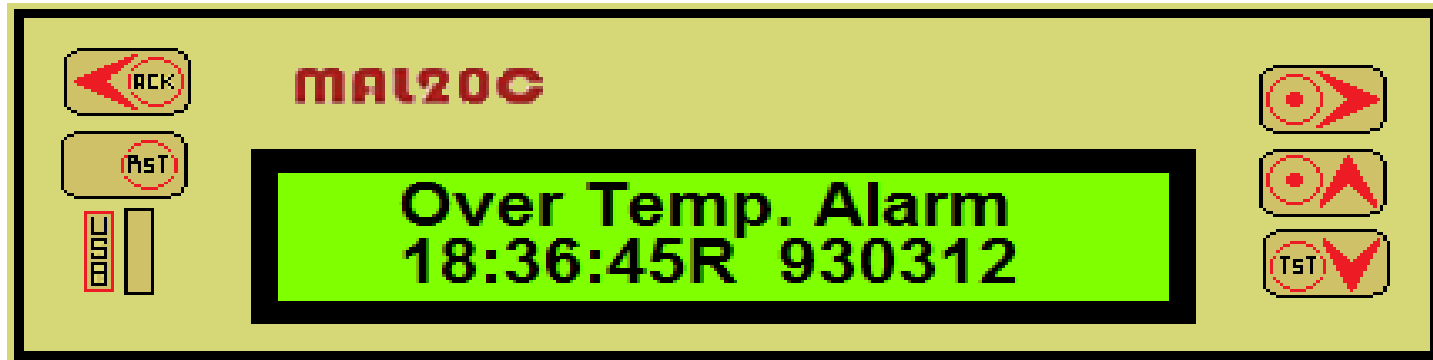
In this figure 46(Inputs 1) and 45 (Common1),44 (Input 2) and 43 (Common 2) and output relay4 can be assigned to be the inputs and output for **Trip Circuit Supervision** application.

Alarm condition

Annunciation of an alarm can be displayed on any one of the **20 windows** located on the front plate. Each window will indicate new alarms with flashing light and acknowledged alarms with steady light. The user can cancel Horn by use Horn Off key acknowledge all new alarms by pressing the "Ack" key. If the alarm input is removed, it can be reseted by "RST" key . In TCS mode window1&2 use to show C.B. and Trip condition. Also the name and time of event display on LCD , for stable alarm there is "A" (active) character and for removed one there is " R" character on LCD.



Front Panel (continued)



The front plate includes an illuminated LCD display with 2 lines of 16 characters.

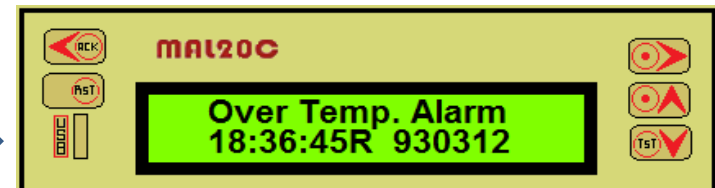
The LCD provides the user with a 16 character alarm description.

Communication Ports

The rear and front of the MAL 20C annunciator is illustrated here.

- The power supply plug-in connector of the MAL20C includes 2 terminals, one for +50 to 180V DC and one GND reference.
- The MAL20C includes two standard interfaces for serial data communication.
 - The **RS485** is intended for long distance bus communication between multiple units.
 - The **USB** port for alarm setting or data collection by a laptop or computer .

+ 50 to 180 V DC		1
- Supply		2
Output Relay 1	N. C.	3
	Com.	4
	N. O.	5
Output Relay 2	N. C.	6
	Com.	7
	N. O.	8
Output Power Safe	N. C.	9
	Com.	10
	N. O.	11
Optional Output TCS	N. C.	12
	Com.	13
	N. O.	14
Optional Output	N. C.	15
	Com.	16
	N. O.	17
RS485	B	
	A	
	SH	



Change the front panel table

- With a small screw driver unlock the two down locks.(F1)
- Open the front frame.(F2)
- Put the front panel table.Adjust it (F3)
- Put the frame at it's position.(F4)



Figure 1: Unlock the frame



Figure 2 : Open front frame



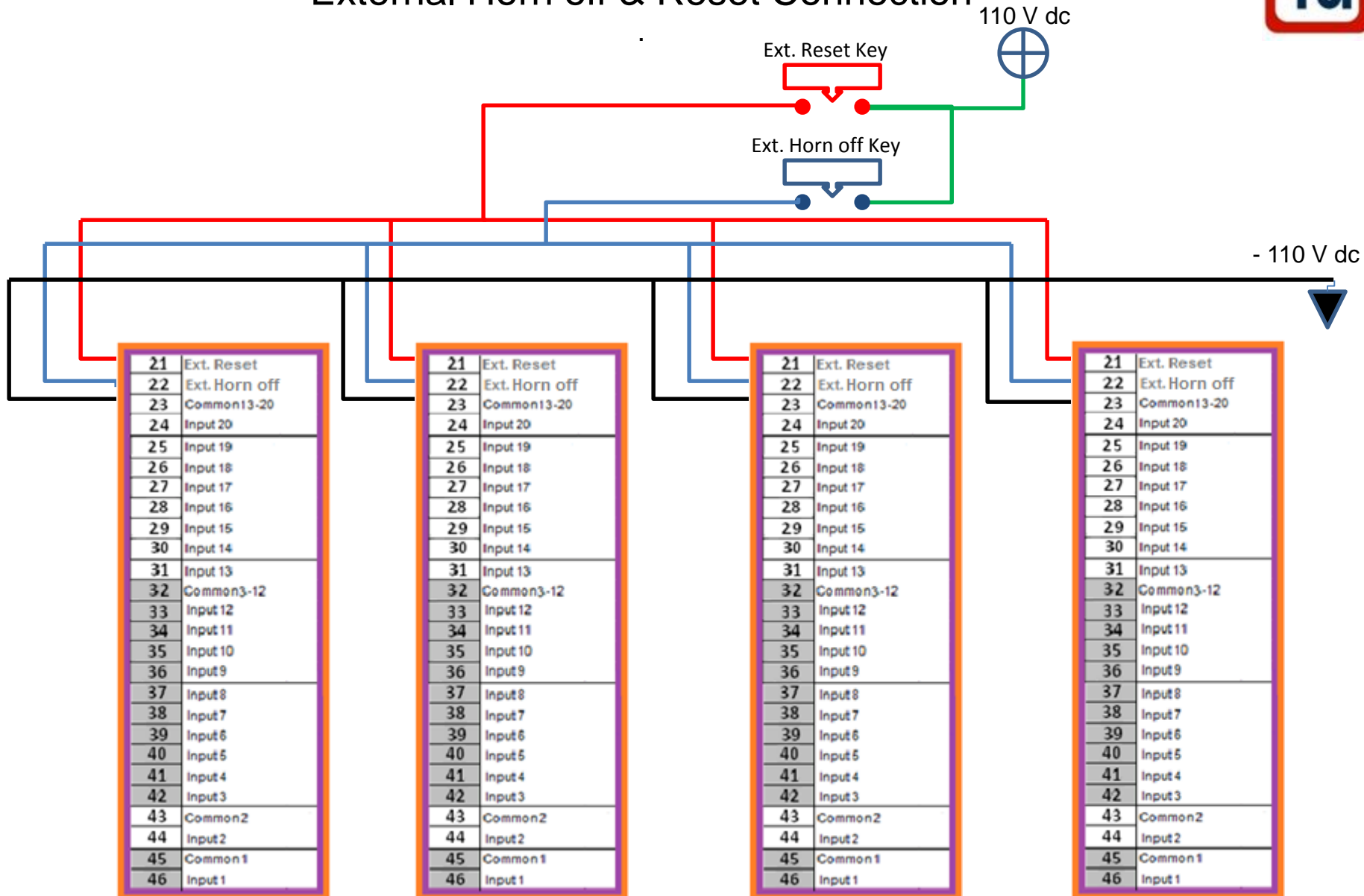
Figure 3 : Put panel table



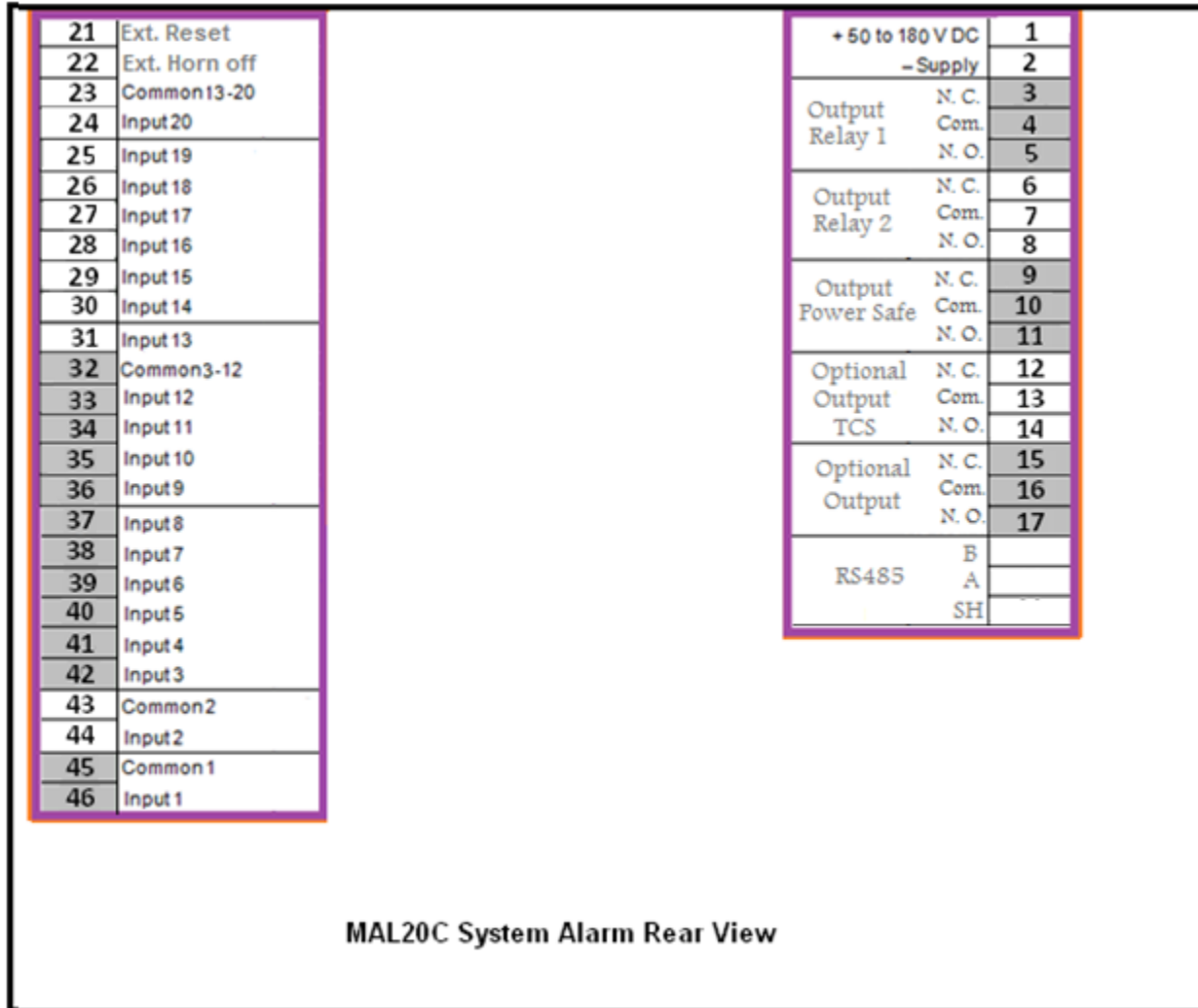
Figure 4 : Put frame



External Horn off & Reset Connection



Connection rear view



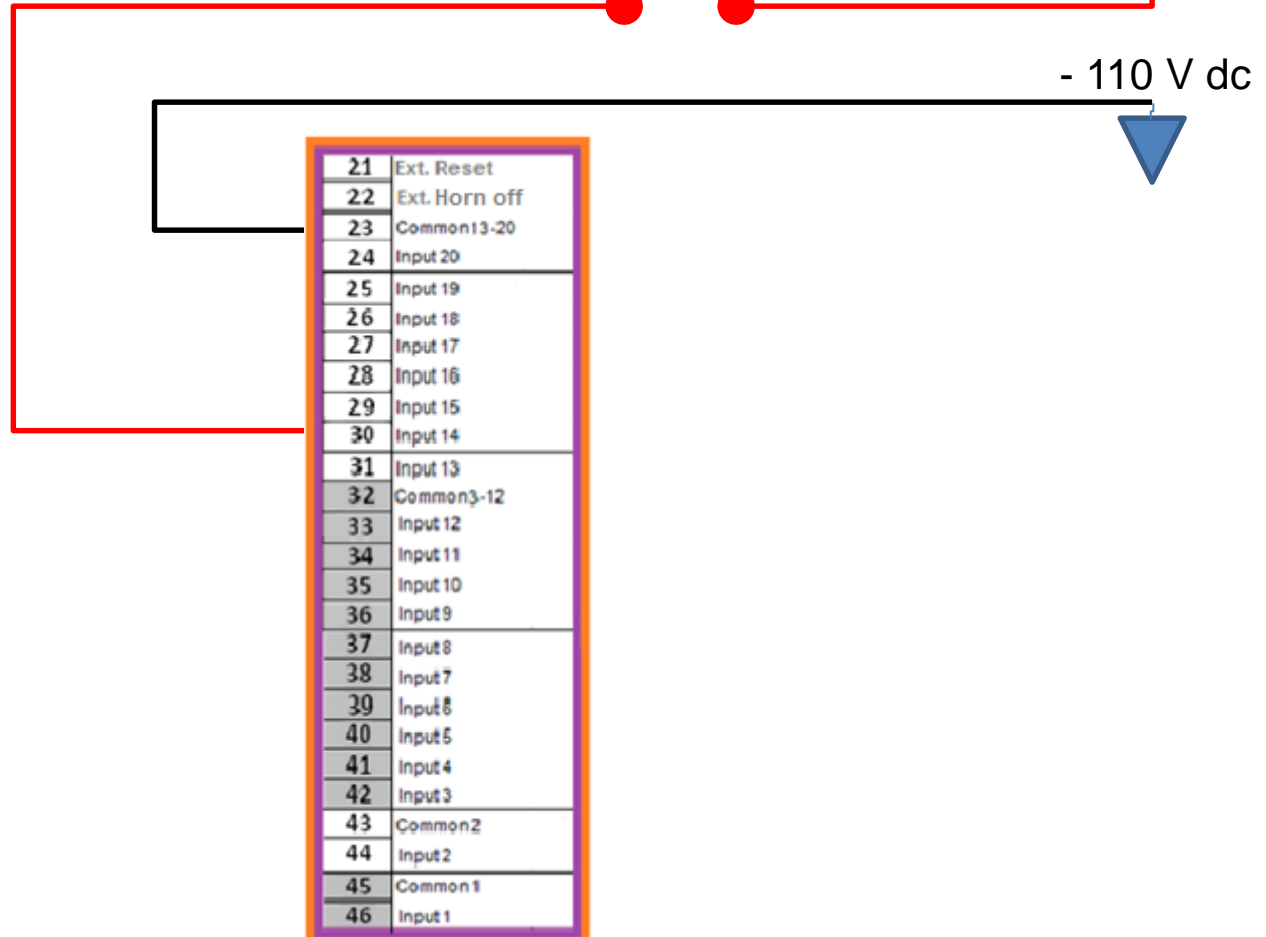
Alarm Connection

Alarm contact

110 V dc

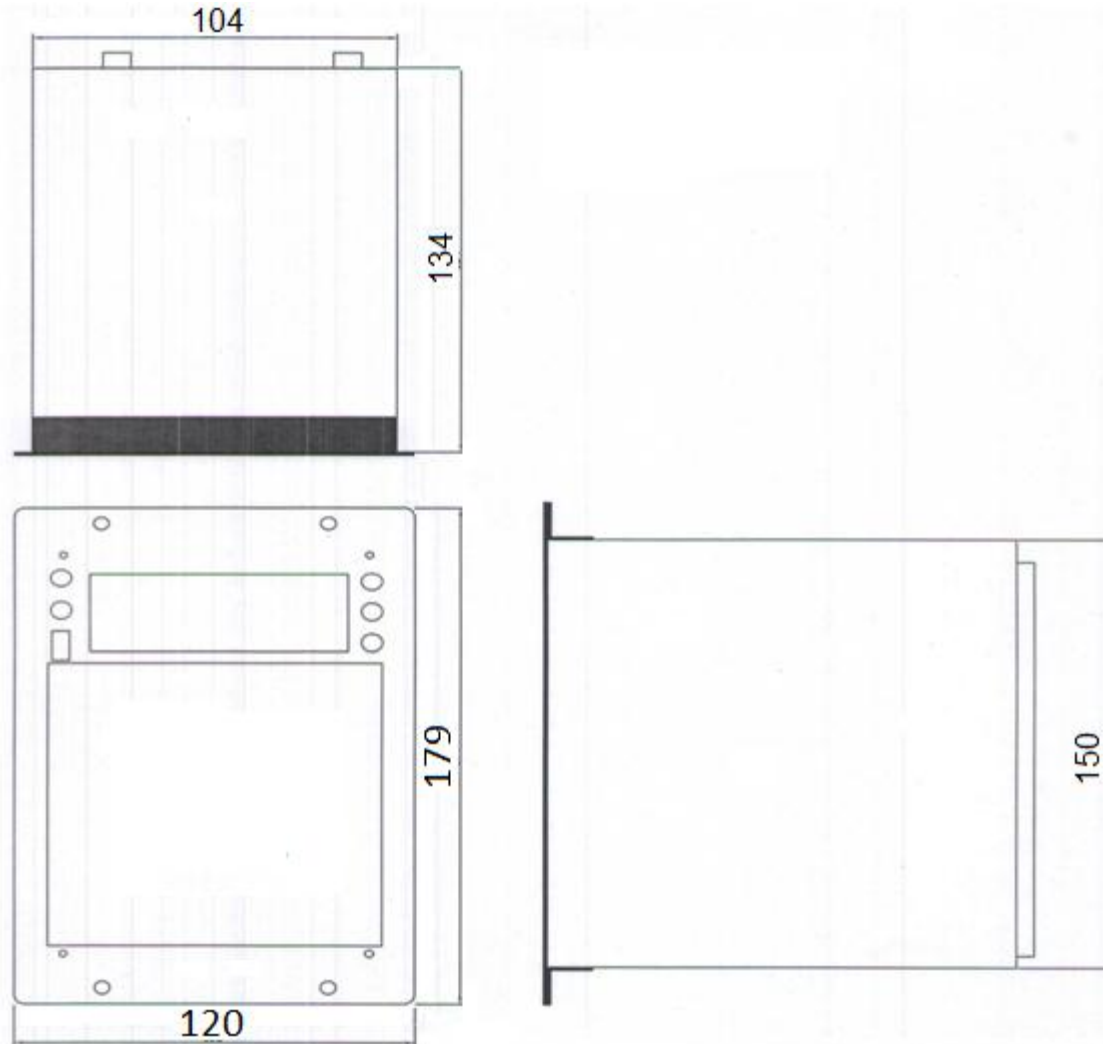


- 110 V dc

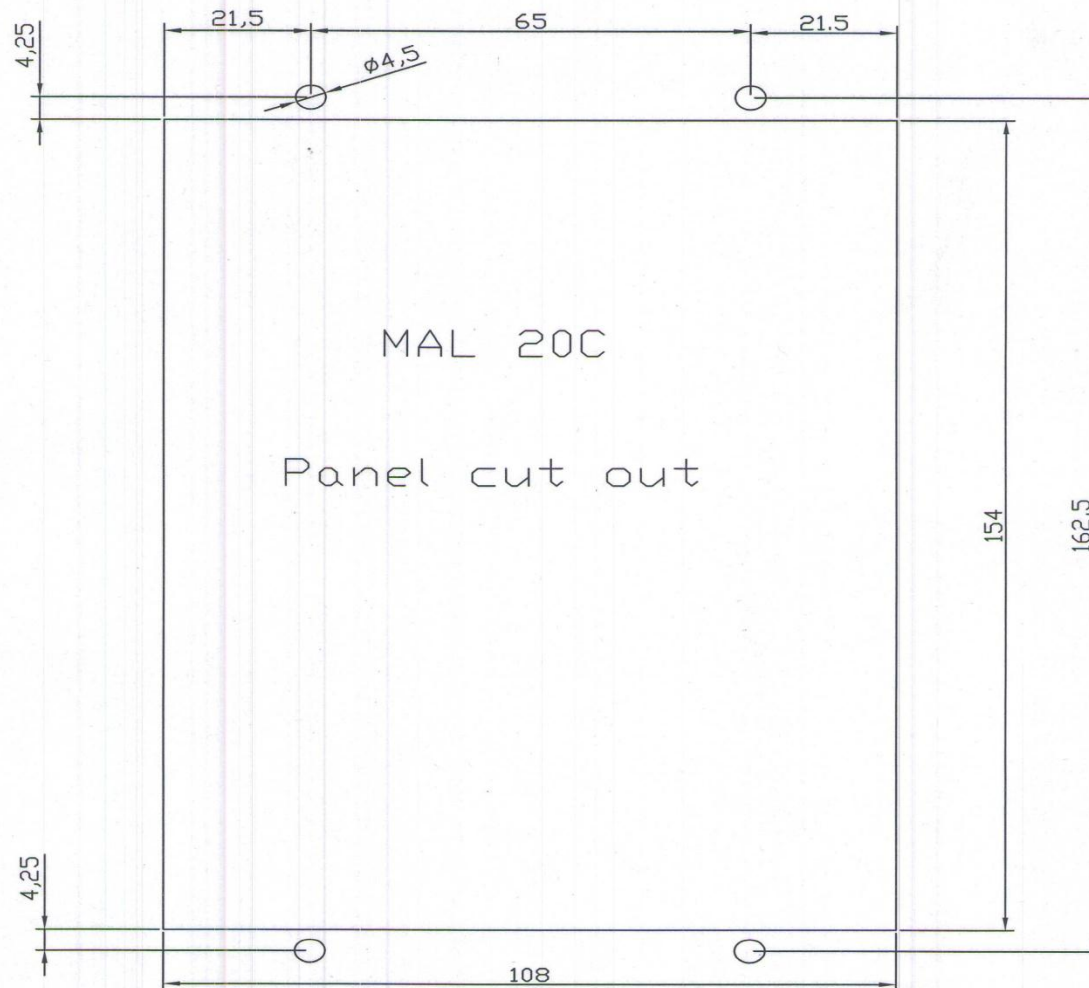


Each Alarm part has separate Common, for example input 13 to 20 have common GND input, the user can connect all Common together to -110Vdc

System alarm box dimensions



Panel Cut out



Installation

- 1- Open the screws in four corners of rear plate of system (Fig. 1)
- 2- Pull out the system from box. (Fig. 2)
- 3- Position the box on panel and fasten the screws. (Fig. 3)
- 4- Position the system in box. (Fig. 2)
- 5- Fasten the screws in four corners of rear plate of system . (Fig. 1)
- 6- Connect the terminals.

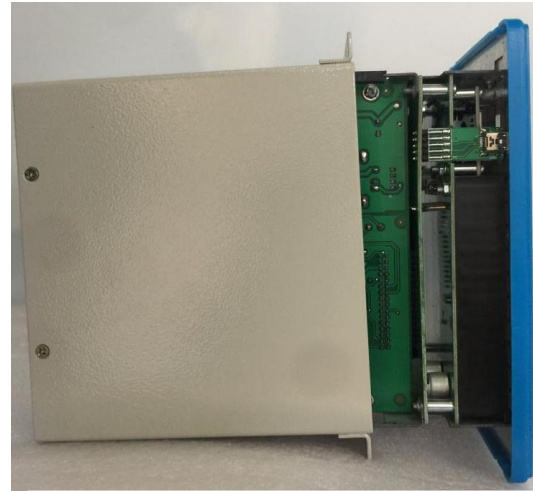


Fig. 2



Fig. 1



Fig. 3