Documentation

MastMinder®

Site Installation Guide

Generic

(single generator)

Warranty

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This document should be read in conjunction with the MastMinder F400e User Guide.

Table of Contents

1. MastMinder Site Installation Kit – Inventory of components

The following components are provided in the this particular MastMinder F400e Site Installation kit.

- 1 x F400e Master Control Unit
- 1 x Generator Status capture module
- 1 x MastMinder 1-Wire +/- 60V sensor
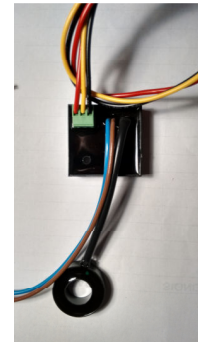- 1 x Inline Fuse Holder and Fuse

Please check all these components are supplied in the kit and familiarise with the equipment, a picture of each of the major components is provided below.

F400e Master Control Unit   1-wire voltage sensor   Gen Status sensor

2. Tools required to perform the installation

- Laptop with GPRS Web connection for Skype & TeamViewer for remote support, with good batteries and/or spares.
- Laptop with RJ45 and Ethernet cable for LAN connection direct to unit or local switch on site
- Mobile phone with good battery
- Flashlight with good battery
- Accurate Voltmeter
- Basic electric installation toolkit:
    - Wire cutters
    - Screw drivers of various heads
    - Etc.
- This Installation Manual
- Enough flexible plastic conduit pipe, if required, to protect any external cables running between the shelter and the generator.
- Selection of cable-ties.
- Good quality CAT5 cable and RJ45 connectors to be used for all Ethernet cabling between switch at site and the F400e unit.
- Good quality CAT5 cable and RJ45 connectors to be used for all 1-wire sensors daisy-chained together between the battery cabinet / shelter and the F400e unit.
- RJ45 crimping tool.
- 0.5mm multi-strand interconnecting signalling cable for various signal connections.
- Multi-purpose connector blocks for connecting 0.5mm cables where necessary.
- 2.5mm flat screwdriver for use on all MastMinder connector blocks.

3. F400e Master Unit Positioning

The base unit is housed in a DIN rail mountable aluminium enclosure. The unit can be mounted in any orientation but must be installed in a dry area. *The MastMinder F400e unit is not designed to be installed in any outside location where it could be exposed to weather or water.*

An outline drawing showing the mounting details is shown below.

4. F400e Outline Drawing
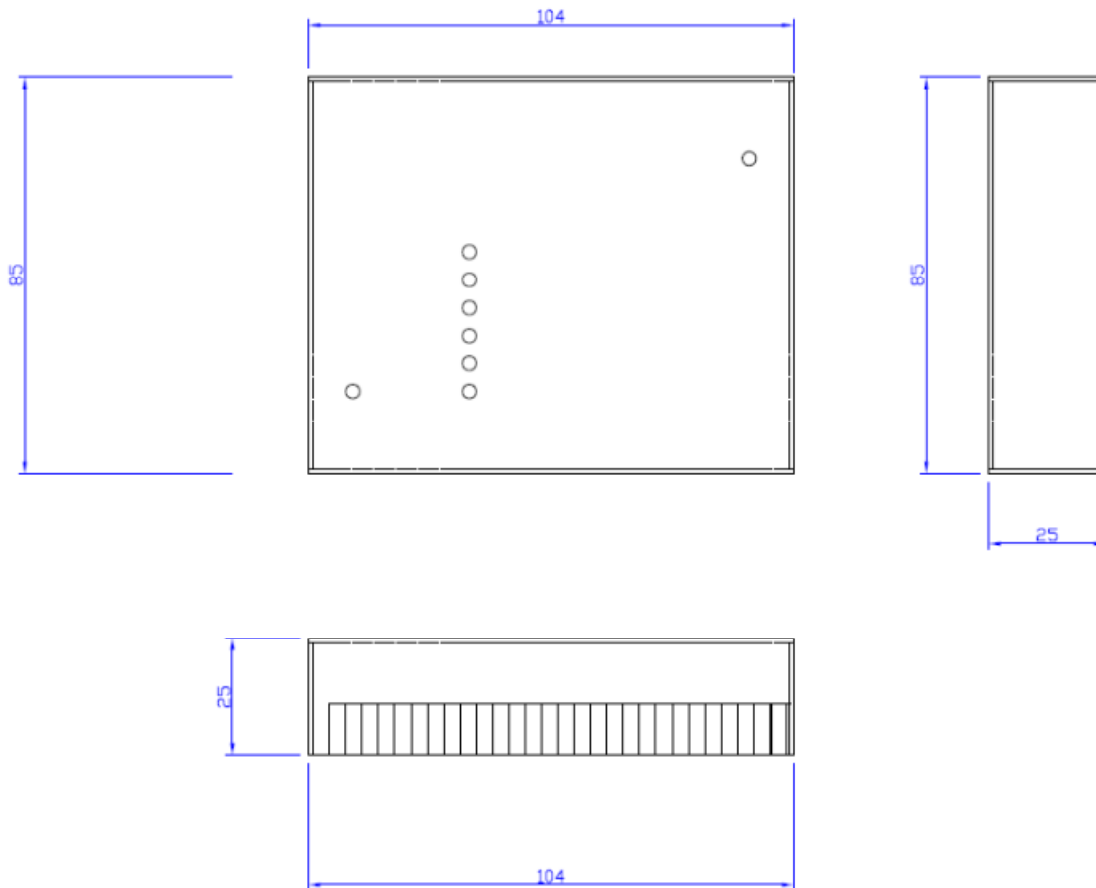
5. LED Indicators

The Unit has six LED indicators located on the front of the unit:
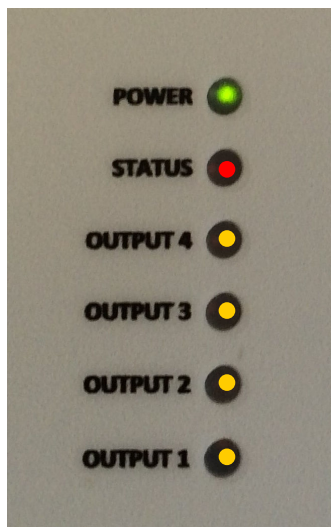
The LED functions are shown in the table below.

GREEN (Power)	RED (Status)	YELLOW Outputs	Meaning
○	○	⊗	Unit not powered up
●	✳	⊗	Normal Start up
●	✳○✳○…	⊗	Self test fail
●	✳✳ (10 sec)	⊗	System active
●	⊗	○	Output Not Active
●	⊗	●	Output Active

LED symbol key

● - LED On
○ - LED Off
✳ - LED Flash
✳ (1 sec) - LED repeating flash (repetition rate)
⊗ - Don't care

6. Power and I/O Signal Connections

All power and IO signal connections to the master unit are made via 3.5mm plug-in terminal blocks.
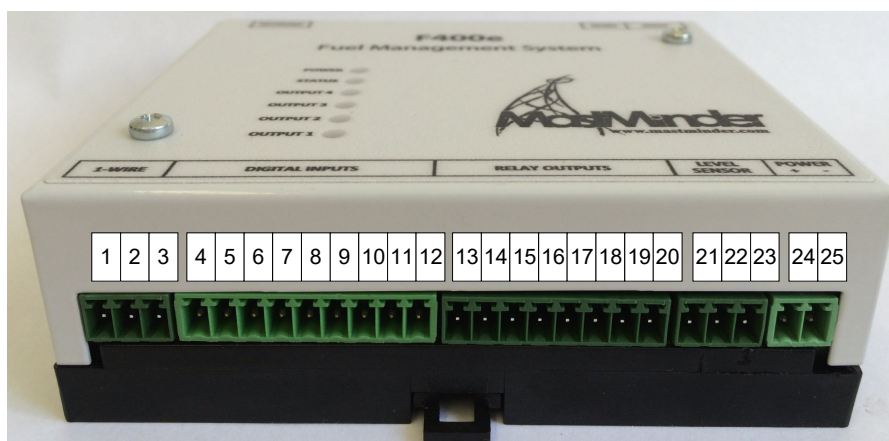
F400e Term.	Direction	Description
1	-	Ground (0V) (to Pin 5 on RJ45)
2	In/Out	1-Wire Interface (to Pin 4 on RJ45)
3	Out	1-Wire 5.0V Supply (to Pin 2 on RJ45)
4	In	Digital Input 1 (Gen Running)
5	In	Digital Input 2 (Gen On Load)
6	In	Digital Input 3
7	In	Digital Input 4 (Common Alarm)
8	In	Digital Input 5
9	In	Digital Input 6 (AMF Auto / Man mode)
10	In	Digital Input 7 (Emergency Stop)
11	In	Digital Input 8
12	-	Ground (0V)
13	-	Output 4, NO Relay Contact
14	-	Output 3, NO Relay Contact
15	-	Output 2, NO Relay Contact
16	-	Output 1, NO Relay Contact (Gives Ground to start gen – active)
17	-	Output 1, NC Relay Contact (Gives Ground to start gen – not active)
18	-	Output 1, Common Relay Contact (Connect to Ground pin 20)
19		Outputs 2,3,4 Common Relay Contact
20	-	Ground (0V)
21	-	Ground (0V) 1
22	In	4-20mA Level Sensor Input 1
23	Out	Level Sensor Filtered Supply Output 1
24	In	6-30VDC Power Input
25	-	Ground (0V)
26	-	Ground (0V) 2
27	In	4-20mA Level Sensor Input 2
28	Out	Level Sensor Filtered Supply Output 2

7. Network Connection

The F400e can be connected to an Ethernet 10baseT or 100baseTX Ethernet network via the standard RJ45 network connector located in the top of the unit.

Network
Connection

7.1 Network LED indicators

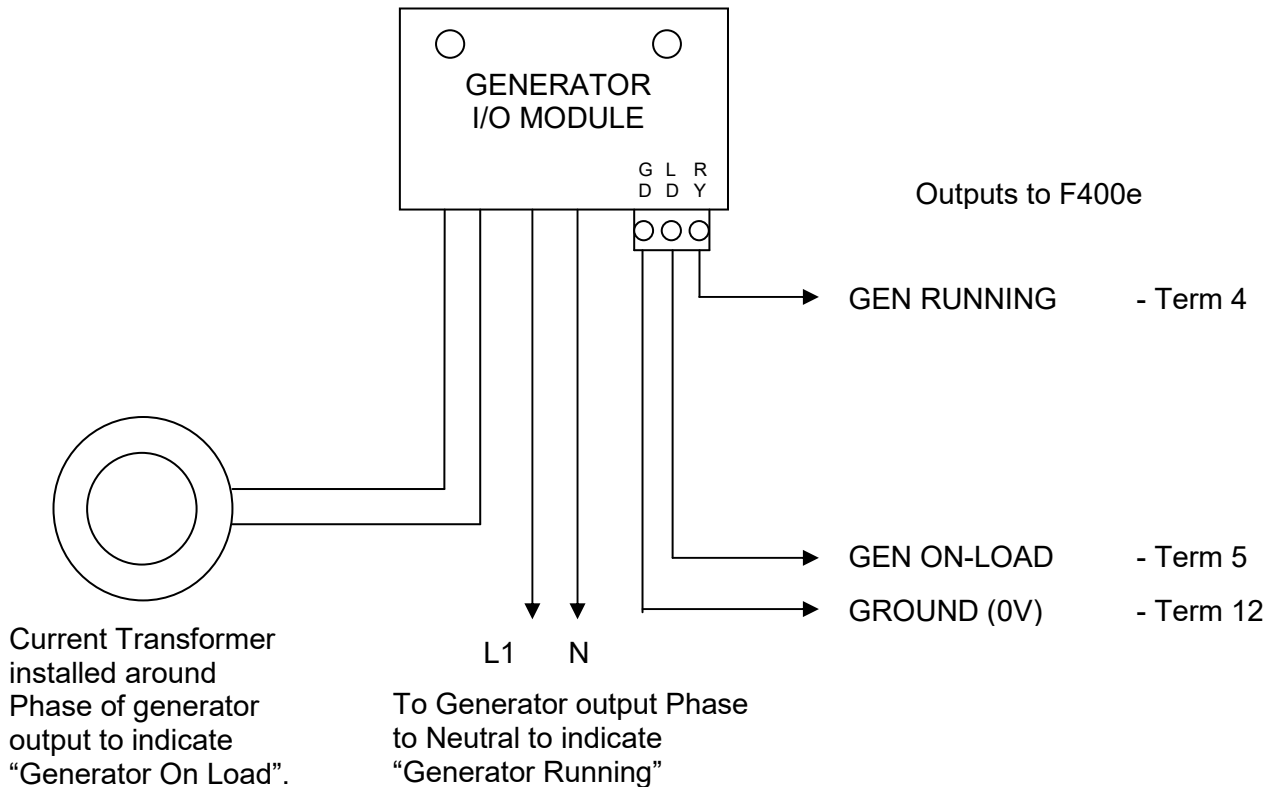There are two LED indicators provided on the network connector.

The Yellow LED is lit if the unit is connected to a 100baseTX network.

The Green LED is lit if the network connection is active and will flash when network data is sent or received.

8. Generator Interface Module

In order to provide compatibility to many different generator and AMF equipment types the MastMinder Generator Interface Module can be used.

The generator interface module senses the generator output voltage and load current and provides the "Generator Running" and "Generator On-Load" signals to the F400e unit.

Current Transformer installed around Phase of generator output to indicate "Generator On Load".

To Generator output Phase to Neutral to indicate "Generator Running"

8.1 Generator Interface Module Installation

1. Locate main generator output circuit breaker.

2. Connect the interface module open clamp current transformer as below -
   a) If US style 110/220 volt then around the L1 or L2 cable to signify current passing and "On Load".
   b) If European style 3-phase then around the N cable to signify current passing and "On Load".
   c) If single phase then around the L1 cable to signify current passing and "On Load".

3. Connect the interface module L1 and N connections as below on the **supply** side of the circuit breaker (so it gives the signal even if the circuit breaker is open) to signify voltage coming from generator and "Generator Running" –
   a) If US style 110/220 volt then between the L1 and L2 cables to signify voltage present and "Generator Running".
   b) If European style 3-phase or single phase then between the L1 and N cables to signify voltage present and "Generator Running".

4. Connect the three output signals from the plug-in connector to the F400e digital inputs.

5. Secure the interface module in a convenient location using self tapping screws, 4mm bolts or cable ties.

10. Reading and Setting I/O Values and Parameters

All system input measured variables and conditions, output states and system control variables are accessed through system "parameters"
Each parameter has a unique 3 character ID and are detailed in the section "System Parameter Reference"

Note: See Console Command Reference in User Manual for more detailed information on specific commands.

10.1   F400e Unit Parameters

Param ID	Type	Attributes	Length	Description	
-- System Parameters --					
901	ROM	RW	20	**Site ID**	20 character string for system identification *Default = Site Name*
902	ROM	RO	4	**Firmware Rev.**	Format n.nn
903	ROM	RO	20	**Module Type**	'9045-V01 F400e'
913	ROM	RW	6	**Admin Password**	Up to 6 character full access password. The password is disabled when the string is empty. *Default = None*
930	EROM	RW	4	**Sent SMS Message Counter**	Keeps a count of the number of SMS messages successfully sent.
931	EROM	RW	4	**SMS Message Number**	SMS Message serial number
950	RAM	RW	2	**RTC Hours**	Real-time clock hour
951	RAM	RW	2	**RTC Minutes**	Real-time clock Minute
952	RAM	RW	2	**RTC Seconds**	Real-time clock Second
953	RAM	RW	2	**RTC Years**	Real-time clock day
954	RAM	RW	2	**RTC Months**	Real-time clock month
955	RAM	RW	2	**RTC Days**	Real-time clock year
956	RAM	RW	12	**RTC Time & Date**	Real-time clock hhmmssddmmyy
9XN	EROM	RO	5	**Unit Serial Number**	000D0640nnn Unit serial number
9U0	RAM	WO	1	**System Reboot**	Writing any value to this parameter will cause the system to reboot
9u0	RAM	WO	1	**Soft System Reboot**	Writing any value to this parameter will cause the system to reboot but preserve RAM parameter values.
9H0	EROM	RW	8	**Hours Counter 0**	Non-volatile total hours counter of the form HHHHH:MM. Counts total time Param 9U9=9 (system active, rule processing on)
9H1	EROM	RW	8	**Hours Counter 1**	Non-volatile total hours counter of the form HHHHH:MM. Counts total time input 1 is active.
9H2	EROM	RW	8	**Hours Counter 2**	Non-volatile total hours counter of the form HHHHH:MM. Counts total time input 2 is active.
9H3	EROM	RW	8	**Hours Counter 3**	Non-volatile total hours counter of the form HHHHH:MM. Counts total time input 3 is active.
9H4	EROM	RW	8	**Hours Counter 4**	Non-volatile total hours counter of the form HHHHH:MM. Counts total time input 4 is active.
9H5	EROM	RW	8	**Hours Counter 5**	Non-volatile total hours counter of the form HHHHH:MM. Counts total time input 5 is active.
9H6	EROM	RW	8	**Hours Counter 6**	Non-volatile total hours counter of the form HHHHH:MM. Counts total time input 6 is active.
9H7	EROM	RW	8	**Hours Counter 7**	Non-volatile total hours counter of the form HHHHH:MM. Counts total time input 7 is active.
9H8	EROM	RW	8	**Hours Counter 8**	Non-volatile total hours counter of the form HHHHH:MM. Counts total time input 8 is active.
9H9	EROM	RW	8	**Network Down Time**	Non-volatile total hours counter of the form HHHHH:MM. Counts total time the GSM network is unavailable.

Param ID	Type	Attributes	Length	Description	
				--Network Parameters --	
9e1	EROM	RW	16	**Unit IP Address**	nnn.nnn.nnn.nnn
9e2	EROM	RW	16	**Unit IP Subnet Mask**	nnn.nnn.nnn.nnn
9e3	EROM	RW	16	**Unit IP Gateway Address**	nnn.nnn.nnn.nnn
9e4	EROM	RW	16	**Message Gateway Server IP Address**	nnn.nnn.nnn.nnn
9e5	EROM	RW	5	**Message Gateway Server Port Number**	nnnn (default 30303)
9e6	EROM	RW	16	**Unit HTTP Username**	
9e7	EROM	RW	16	**Unit HTTP Password**	
9e8	EROM	RW	5	**Unit HTTP Port Number**	nnnn (default 80)
9e9	EROM	RW	16	**Public IP Address**	If different from device IP address e.g. if F400 is installed on a local network behind a router.
9GD	ROM	RW	16	**FTP Server IP Address**	nnn.nnn.nnn.nnn
9GE	ROM	RW	16	**FTP Username**	
9GF	ROM	RW	16	**FTP Password**	
9GG	ROM	RW	24	**Download Filename**	(must have .cff, .cpf or cwf extension)
9GZ	ROM	RW	1	**Start File Download**	Set to any value to start download
9eA	EROM	RW	1	**Use Public IP Address**	Set to "Y" to use public IP address in 9e9
9eB	EROM	RW	1	**Dynamic IP Address**	Set to "D" if F400 IP address is dynamic. Set to "Y" if F400 IP address is static (default)
915	RAM	RO	10	**IP Network Status**	Status of IP Connection "UP" or "DOWN"
				-- 1-Wire Interface Parameters --	
10 x 1-Wire device slots					
9a1-9aA	RAM	RO	1-8	**1-W Device slot result**	Variable data from 1-Wire device. Format depends on device type
9b1-9bA	EROM	RW	1	**1-W Device Type**	Specifies 1-Wire device type as per device type table. Set to 0 if no device present.
9c1-9cA	EROM	RW	16	**1-Wire Device Address**	Specifies 1-Wire device address for device

1-Wire Device Type Table			
Type (9bn)	Description	Measurement	Format (9an)
1	T-Sense temperature sensor device based on maxim MAX1820PAR	^{o}C	nn
2	MS-TV / MS-TH device measuring temperature based on DS2438	^{o}C	nn
3	MS-TV device measuring voltage (0-10V) based on DS2438	mV	n.nnn
4	MS-TH device measuring Humidity (0-100%) based on DS2438	%RH	nnn
5	MastMinder 1-wire +/- 300 Amp DC Current Sensor	Amps	+/-nnn
6	MastMinder 1-wire isolated DC 0-100 voltage sensor	Volts	nn.n
A	MAX DS18S20 Based temperature sensor	^{o}C	nn
1-Wire Device Type Recommended Slot Usage			
Type (9bn)	Description	Slot	Alternate Slot
1	T-Sense temperature sensor device based on maxim MAX1820PAR	7	8
2	MS-TV / MS-TH device measuring temperature based on DS2438	7	8
3	MS-TV device measuring voltage (0-10V) based on DS2438	1	2
4	MS-TH device measuring Humidity (0-100%) based on DS2438	6	6
5	MastMinder 1-wire +/- 300 Amp DC Current Sensor	9 (main bat)	A (aux or load)
6	MastMinder 1-wire isolated DC 0-100 voltage sensor	3 (main bat)	4 (aux or load)
A	MAX DS18S20 Based temperature sensor	7	8

There are also specialist 1-wire commands which may be issued from the Console.
Note that all these commands require only the one device on the 1-wire network at the time of issuing the command. (It is advised only qualified personnel should use these).

Command	Function
1wid	returns the ID of the unit connected on the 1-wire interface
1wzc	calibrate to zero
1wgp	calibrate to a positive gain
1wgn	calibrate to a negative gain

-- Rule Processing Parameters --					
9U9	ROM	RW	1	**Rule Processing Enable**	Set to "9" to enable rule processing, all other values disable rule processing. Default: "0"
-- 36 Rule Enable Parameters --					
9E0 – 9EZ	ROM	RW	1	**Rule Enable**	Enables/disables processing rule. 'Y' = enabled, 'N' = Disabled *Default = N (disabled)*
-- 36 user defined processing rules --					
9P0 – 9PZ	ROM	RW	160	**Rule Body**	String containing the rule directives *Default = none*
-- 36 rule qualify times --					
9Q0 – 9QZ	ROM	RW	4	**Rule Qualify Time**	Qualification time in seconds between a matching condition and the rule being triggered. 0-9999 *Default = 0*
-- 36 rule rearm times --					
9R0 - 9RZ	ROM	RW	4	**Rule Rearm Time**	Time in minutes to re-enable a triggered rule. 0-9999 *Default = 0*
-- 36 current rule status --					
9S0 – 9SZ	RAM	RO	8	**Rule Status**	Off - Not enabled. Activ - Rule enabled, not triggered (no condition active). PreTrig - Unqualified Trigger Condition. Trig - Rule triggered. PreUTrig - Unqualified Un-Trig. Condition. Rearmed - Rule triggered, re-armed (no condition active). Trig,R - Rearmed, still triggered
9IR	RAM	RW	1	**Invalid Rule**	Null if no rule syntax errors. Will contain rule number 0-9 or A-Z if invalid rule found
9WW	ROM	RW	16	**Parameter File Version**	Current Parameter File Version
9M0	ROM	RW	160	**User Message**	User defined 'canned' Message. Message can contain parameter 'tags' allowing dynamic data to be included in the message. Messages can consist entirely of Parameter tags.

Param ID	Type	Attributes	Length	Description	
				-- I/O Parameters --	
9I1	RAM	RO	1	**Digital Input 1**	Logical value of digital input 1, '0' or '1'
9I2	RAM	RO	1	**Digital Input 2**	Logical value of digital input 2, '0' or '1'
9I3	RAM	RO	1	**Digital Input 3**	Logical value of digital input 3, '0' or '1'
9I4	RAM	RO	1	**Digital Input 4**	Logical value of digital input 4, '0' or '1'
9I5	RAM	RO	1	**Digital Input 5**	Logical value of digital input 5, '0' or '1'
9I6	RAM	RO	1	**Digital Input 6**	Logical value of digital input 6, '0' or '1'
9I7	RAM	RO	1	**Digital Input 7**	Logical value of digital input 7, '0' or '1'
9I8	RAM	RO	1	**Digital Input 8**	Logical value of digital input 8, '0' or '1'
9J1	ROM	RW	1	**Digital Input Level 1**	Active level of digital input 1 (0,1 or -)
9J2	ROM	RW	1	**Digital Input Level 2**	Active level of digital input 2 (0,1 or -)
9J3	ROM	RW	1	**Digital Input Level 3**	Active level of digital input 3 (0,1 or -)
9J4	ROM	RW	1	**Digital Input Level 4**	Active level of digital input 4 (0,1 or -)
9J5	ROM	RW	1	**Digital Input Level 5**	Active level of digital input 5 (0,1 or -)
9J6	ROM	RW	1	**Digital Input Level 6**	Active level of digital input 6 (0,1 or -)
9J7	ROM	RW	1	**Digital Input Level 7**	Active level of digital input 7 (0,1 or -)
9J8	ROM	RW	1	**Digital Input Level 8**	Active level of digital input 8 (0,1 or -)
9V1	RAM	RO	4	**Main Supply Value**	Measured value of external supply, nn.n Volts
9V2	RAM	RO	4	**POE Supply Value**	Measured value of Power over Ethernet supply, nn.n Volts
9V5	RAM	RO	3	**4-20mA (Level Sensor)**	Measured value of external 4-20mA input , 0-255
9VB	RAM	RO	4	**5V Supply Value**	Measured value of 5V internal supply, n.n V
9U2	RAM	RW	1	**Digital Input Change**	Set to "1" if any digital input changes state. Remains set until cleared by user.
9U3	RAM	RW	1	**Analogue Input Status Change**	Set to "1" if any analogue input changes state. Remains set until cleared by user.
9X1	ROM	RW	1	**Digital Output Value**	Value of digital output , '0' or '1' This output controls a C/O relay.
9X2	ROM	RW	1	**Digital Output Value**	Value of digital output , '0' or '1' This output controls a N/O relay.
9X3	ROM	RW	1	**Digital Output Value**	Value of digital output , '0' or '1' This output controls a N/O relay.
9X4	ROM	RW	1	**Digital Output Value**	Value of digital output , '0' or '1' This output controls a N/O relay.
9T1	ROM	RW	4	**Digital Output 1 Timer**	Optional time in minutes for output to remain in current state before automatically returning to previous state. 0-9999 minutes. A value of '0' disables the timer function and the output remains unchanged.
9T2	ROM	RW	4	**Digital Output 2 Timer**	As for 9T1
9T3	ROM	RW	4	**Digital Output 3 Timer**	As for 9T1
9T4	ROM	RW	4	**Digital Output 4 Timer**	As for 9T1
9WM	RAM	RW	4	**User Seconds Timer 1**	User Programmable 4 digit seconds counter 0000-9999 seconds. Counts down from set value and stops at 0000
9WN	RAM	RW	4	**User Seconds Timer 2**	User Programmable 4 digit seconds counter 2
9U4	RAM	RW	4	**User Minute Timer 1**	User Programmable 4 digit minutes counter 0000-9999 minutes. Counts down from set value and stops at 0000
9U5	RAM	RW	4	**User Minute Timer 2**	User Programmable 4 digit minutes counter 2

Param ID*	Type	Attributes	Length	Description	
				-- Fuel Monitoring Parameters --	
9L1	EROM	RW	1	**Level Sensor Type**	Level Sensor Type: 0=Ultrasonic Sensor 1=L400 2M 2=L400 4M 3=L400 10M
9L2	EROM	RW	4	**Fuel Specific Gravity**	Specific gravity of fuel. Usually between 0820 and 0950 for diesel. Default = 0880
9L3	EROM	RW	1	**Tank Type**	Type of Tank: 1=Linear (cuboid or cylinder on end) 2=Cylinder on it's side 3=User defined tank profile
9L4	EROM	RW	4	**Tank Diameter**	Diameter of tank in mm, 4 digits long. (only needed for tank type 2)
9L5	EROM	RW	4	**Maximum Useable Level**	Maximum useable level in mm, 4 digits.
9L6	EROM	RW	4	**Minimum Useable Level**	Minimum useable level in mm, 4 digits.
9L7	RAM	RO	4	**Measured Level**	Current measured level in mm
9LA-9LP	EROM	RW	4	**User Level Entries**	16 user defined level entries. Only used for tank type 3. As few (min 0) or as many (max 16) can be used in order to define tank level capacity characteristics. Entries are in mm and must be 4 digits long (leading 0's required)
9CA-9CP	EROM	RW	2	**User Capacity Entries**	16 user defined capacity entries. Only used for tank type 3. As few (min 0) or as many (max 16) can be used in order to define tank level capacity characteristics. Each entry is paired with corresponding level entry. Entries are in % of full capacity and must be 2 digits long (leading 0's required)
9F1	RAM	RO	5	**Fuel Consumption**	Fuel consumption in units/hour. Only updated while engine is running (digital input 1 is active). Format nn.nn
9F2	RAM	RO	5	**Average Fuel Cons.**	Average fuel consumption in units/hour over last 32 hours of engine running Format nn.nn
9F3	RAM	RO	1	**Consumption Alarm**	Value "0" = no alarm, "1" = alarm, "2" = fuel Added ***Engine Running:*** Alarm is active if current fuel consumption exceeds average fuel consumption by more than the margin set in parameter 9F4. *Or* If fuel consumption is > 5 units/hour more than the margin set in parameter 9F4 ***Engine Stopped:*** Alarm is active if fuel level decreases by more than the margin set in parameter 9F4
9F4	ROM	RW	5	**Fuel Margin**	Fuel consumption/level alarm margin in units. nn.nn
9F5	EROM	RW	1	**Shared Fuel Tank**	Set to "1" if another generator is able to use the monitored fuel tank.

Param ID	Type	Attributes	Length	Description
		-- User Parameters --		
9U1	RAM	RW	1	**User Parameter**
9WC	RAM	RW	6	**User Parameter**
9WD	RAM	RW	6	**User Parameter**
9WE	RAM	RW	6	**User Parameter**
9WF	RAM	RW	6	**User Parameter**
9WG	RAM	RW	8	**User Parameter**
9WH	RAM	RW	8	**User Parameter**
9WI	RAM	RW	8	**User Parameter**
9WJ	RAM	RW	8	**User Parameter**
9WO	RAM	RW	8	**User Parameter**
9WP	RAM	RW	12	**User Parameter**
9WU	EROM	RW	2	**User Parameter**
9WV	EROM	RW	2	**User Parameter**
9W1	EROM	RW	8	**User Parameter**
9W2	EROM	RW	8	**User Parameter**
9W3	EROM	RW	8	**User Parameter**
9W4	EROM	RW	8	**User Parameter**
9W5	EROM	RW	8	**User Parameter**
9W6	EROM	RW	8	**User Parameter**
9KA	EROM	RW	2	**User Parameter**
9W8	EROM	RW	16	**User Parameter**
9WX	EROM	RW	16	**User Parameter**
9U6	ROM	RW	1	**User Parameter**
9U7	ROM	RW	1	**User Parameter**
9UA	ROM	RW	4	**User Parameter**
9UB	ROM	RW	4	**User Parameter**
9UC	ROM	RW	4	**User Parameter**
9UD	ROM	RW	4	**User Parameter**
9UE	ROM	RW	4	**User Parameter**
9UF	ROM	RW	4	**User Parameter**
9UG	ROM	RW	4	**User Parameter**
9UH	ROM	RW	4	**User Parameter**
9UI	ROM	RW	4	**User Parameter**
9UJ	ROM	RW	4	**User Parameter**
9UK	ROM	RW	4	**User Parameter**
9UL	ROM	RW	2	**User Parameter**
9UM	ROM	RW	2	**User Parameter**
9WQ	ROM	RW	32	**User Parameter**
9WR	ROM	RW	10	**User Parameter**
9WS	ROM	RW	8	**User Parameter**
9WT	ROM	RW	4	**User Parameter**
9WW	ROM	RW	16	**User Parameter**
9UO	ROM	RW	4	**User Parameter**
9UP	ROM	RW	4	**User Parameter**
9UQ	ROM	RW	4	**User Parameter**
9UR	ROM	RW	4	**User Parameter**
9US	ROM	RW	4	**User Parameter**
9UT	ROM	RW	4	**User Parameter**
9UU	ROM	RW	4	**User Parameter**
9UV	ROM	RW	4	**User Parameter**
9UW	ROM	RW	4	**User Parameter**
9UX	ROM	RW	6	**User Parameter**
9UY	ROM	RW	4	**User Parameter**
9UZ	ROM	RW	4	**User Parameter**

11. Remote WEB Access

The F400e has an onboard web server which gives access to a number of the major parameters and interfaces on the F400e.

Web access is from a web browser.

Three pages are available through this interface as follows:

Main home page:

MastMinder F400e

Site Name: GTAT Site 102

Type	9045-V01 F400e	Firmware Revision				4.02			
Ethernet Address	000D06400038	Parameter File Version				GTAT Site 101 V1			
						Reboot		Download	
Site Name	GTAT Site 102								
IP Address	192.168.0.102	HTTP Port Number				80			
Subnet Mask	255.255.255.0	HTTP Username				mastminder			
Gateway IP Address	192.168.0.1	HTTP Password				M400e			
Message Server IP Address	192.168.0.78	Download Server IP Address				192.168.0.2			
Download Filename	GTandT F400E V1.cpf								
Date/Time	23 -04 -15 13 :07 :40							Submit	
Supply	12.0V	Input Qual Time 2	1	2	3	4	5	6	7	8
PoE Supply	----V	Input Config Submit	1 ▼	1 ▼	0 ▼	0 ▼	0 ▼	0 ▼	0 ▼	0 ▼
Internal Volts	4.9V	Input Value	1	1	0	0	0	0	0	0
4-20mA Input	59	Outputs Submit	0 ▼	0 ▼	0 ▼	0 ▼				
Fuel Level	0332 mm	Consumption c/h	12.25	Ave Consumption c/h	08.81				
Sensor Type	1 ▼	Tank Height	1150	Fuel Alarm	1 ▼				
Tank Type	2 ▼	Max Fill Level	1150	Threshold	04.00				
Fuel Sg	0840	Min Fill Level	0025						
Shared Tank	0 ▼	Height@20mA	2039					Submit	
System Active	9 ▼	Invalid Rule	▼					Submit	

Console   Rule Settings

Rule & Message Page:

MastMinder F400e

Site Name: GTAT Site 102

Param File Version: GTAT Site 101 V1

Rule 0	Enable Y ▾	Status: Active	Qual 60	Rearm 0	if %9X1=$"1" or %9I5=$"1" and %9I2=$"0" and %9ULI$"1"
Rule 1	Enable Y ▾	Status: Active	Qual 0	Rearm 0	if %9ULI$"0" and %9I2=$"1" then set %9UL="0" set %9U1="1"
Rule 2	Enable Y ▾	Status: Active	Qual 2	Rearm 0	if %9X2=$"1" then set %9UL="0" set %9X2="0" set
Rule 3	Enable Y ▾	Status: Active	Qual 2	Rearm 0	if %9X4=$"1" then set %9X4="0" set %9X4="0000"
Rule 4	Enable Y ▾	Status: Trig	Qual 0	Rearm 0	if %9F3=$"1" then set %9U1="1"
Rule 5	Enable Y ▾	Status: Active	Qual 0	Rearm 0	if %9F3=$"2" then set %9U1="1"
Rule 6	Enable Y ▾	Status: Active	Qual 0	Rearm 0	if %9V1<<%9UO then set %9U1="1"
Rule 7	Enable Y ▾	Status: Active	Qual 0	Rearm 0	if %9I5=$"1" then set %9UC="5"
Rule 8	Enable Y ▾	Status: Active	Qual 60	Rearm 0	if %9V1<<%9UO then set %9X1="1" set %9T1="0060" set
Rule 9	Enable Y ▾	Status: Trig	Qual 600	Rearm 0	if %9I1=$"1" then set %9UB="0" set %9UH=%950 set
Rule A	Enable Y ▾	Status: Active	Qual 0	Rearm 0	if %9UH==%950 and %9UJ==%951 then set %9UB=%9UB+"1"
Rule B	Enable Y ▾	Status: Active	Qual 0	Rearm 0	if %9UB=>%9UA and %9X1=$"0" and %9I1=$"0" then set
Rule C	Enable Y ▾	Status: Active	Qual 0	Rearm 0	if %9X1=$"0" and %9I5=$"0" and %9UCI$"3" then set
Rule D	Enable Y ▾	Status: Trig	Qual 0	Rearm 0	if %9X1=$"0" and %9I5=$"0" then set %9WC="1"
Rule E	Enable Y ▾	Status: Active	Qual 0	Rearm 0	if %9X1=$"1" then set %9WC="0"
Rule F	Enable Y ▾	Status: Active	Qual 0	Rearm 0	if %9I5=$"1" then set %9WC="0"
Rule Z	Enable Y ▾	Status: Active	Qual 0	Rearm 0	if %9U1I$"0" or %9U2I$"0" or %9U3I$"0" or %9U4=="0000"

Submit

Message 0	%901;%931;#D1;%9I1-%9I2-%9I3%9UL-%9I4%9I6%9I7%9I80%9F3%9X3%9WC---N%9UC;%9V1;%9V2;;;%9V5;%9L7;;;;;;;
Message 1	
Message 1	
Message 3	
Message 4	
Message 5	
Message 6	
Message 7	

Submit

Home Page   Console

Console Command Page:

MastMinder F400e

Site Name: GTAT Site 102

| Console Command | | Submit |
| Response: | Mastminder F400e Ready | |

Home Page   Rule Settings

The Console command page can be used to issue F400e local console commands to set or read any parameters not displayed in the other two web pages.
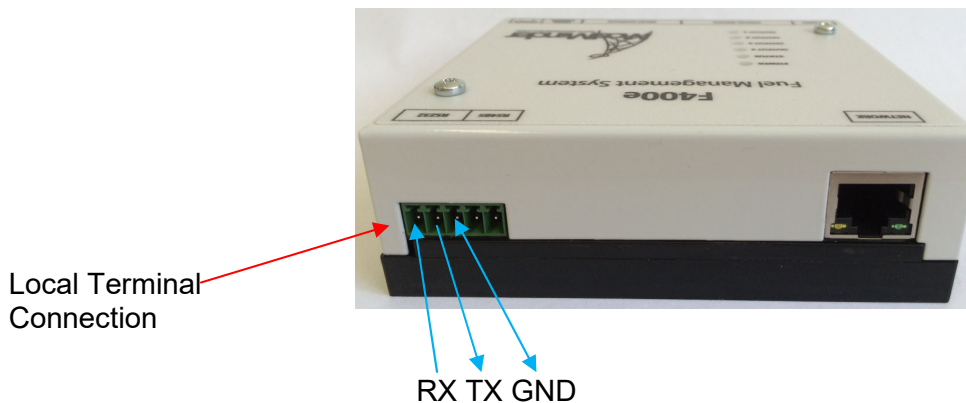
12. System Console Port

A system console is provided to allow management of the remote site unit via a locally connected RS232 serial terminal (e.g. PC running HyperTerminal)

12.1   Local terminal connection

A local serial terminal may be connected to the RS232 port 1.

Serial port 1 is available for use as a local console port at any time.

The communications format is fixed to 9600bps, no parity and 1 stop bit.

Local Terminal Connection

RX TX GND

12.2   Console Port Commands

Once connected, the system console will respond with the prompt:

Enter Password:

(if an admin password has been set)

<Site ID> <Version> :

(if no password has been set, or when the correct password has been entered)

e.g.

Mastminder 1.14 :

12.2.1 Console Command Reference

The following commands are available through the console port.

Command get
Description Displays the value of one or more system parameters
Syntax get ppp,[ppp],[ppp]

Response `<parameter value>`
`[<parameter value>]`

Where ppp = parameter ID

Command getm
Description Displays the value of 20 consecutive system parameters
Syntax getm ppp

Response `ppp=<parameter value>`
`ppp=<parameter value>`
`ppp=<parameter value>`
`…`
`ppp=<parameter value>`

Where ppp = parameter ID

Command set
Description sets the value of a system parameter
Syntax set ppp=ddd

Response `None (prompt)`

Where ppp = parameter ID and ddd = new parameter data to set.

Command logout
Description Logs the current user off
Syntax logout

Response `Enter Password:`

An automatic logout will occur if no console commands are received for more than 30 minutes.

13. Complete Site schematic – Generic specific
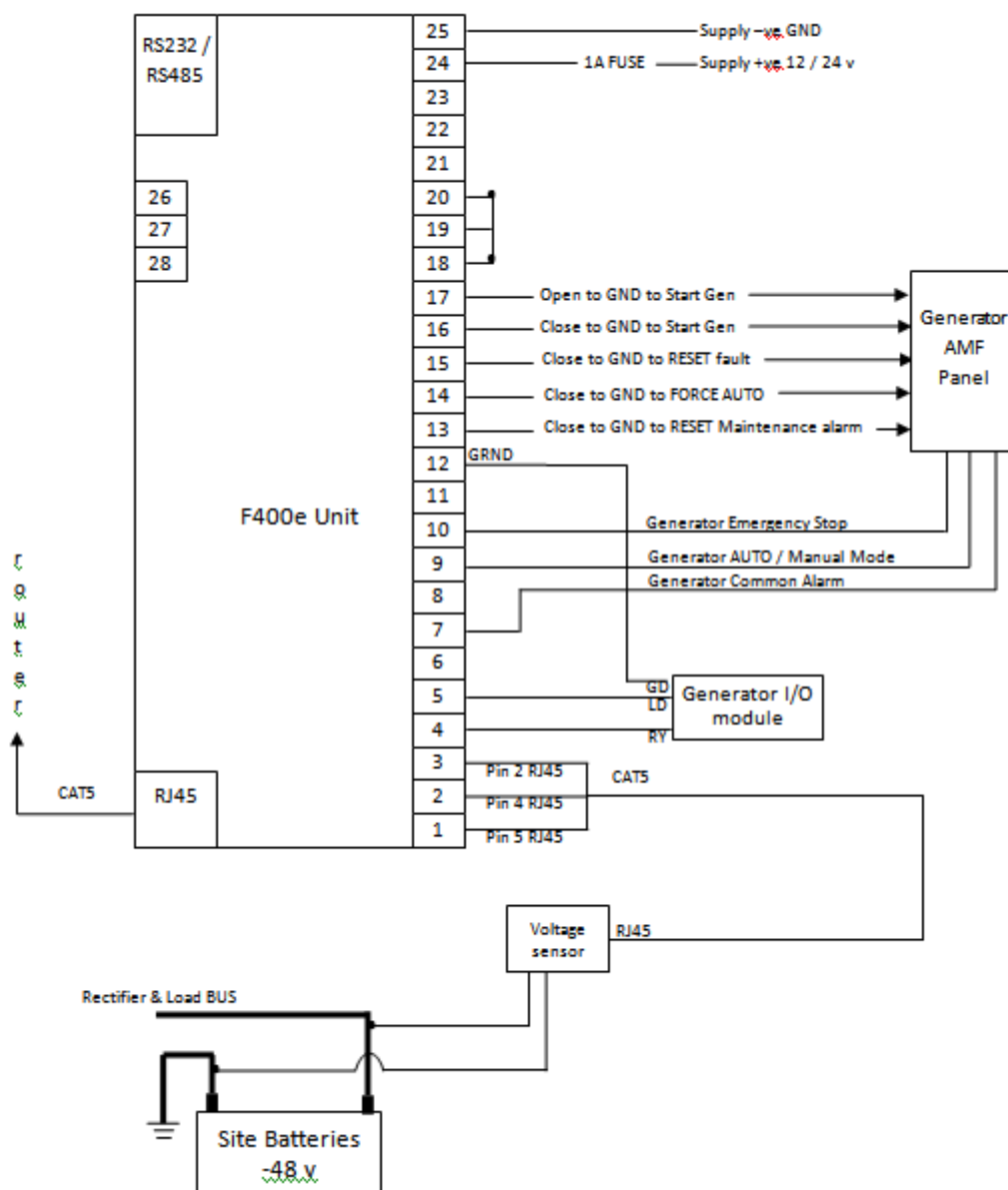
14. F400e Master Unit Connection Schedule – Generic specific

F400e Terminal	Description	Destination	Destination Terminal	Wire Colour
1	1-wire interface Ground	1-wire CAT5	Pin 5 on 1-wire CAT5	
2	1-wire interface Signal	1-wire CAT5	Pin 4 on 1-wire CAT5	
3	1-wire interface Power	1-wire CAT5	Pin 2 on 1-wire CAT5	
4	Generator Running Signal	Gen I/F Module	RY on Gen I/F	
5	Generator On Load Signal	Gen ATS auxiliary	LD on Gen I/F	
6				
7	Common Alarm from AMF	AMF Panel	Common Alarm O/P	
8				
9	Gen AUTO from AMF	AMF Panel	AUTO / Manual O/P	
10	Emergency Stop AMF	AMF Panel	Emergency Stop O/P	
11	Water In Fuel Signal	WIF Sensor	Signal Output	
12	Ground	Common Ground	Ground for all inputs	
13	RESET Maint Alarm	AMF Panel	RESET Maint Alarm I/P	
14	Force AUTO Mode	AMF Panel	Force AUTO Mode I/P	
15	RESET Fault Alarm	AMF Panel	RESET Fault Alarm I/P	
16	Close to Grnd to start	AMF Panel	Test Start Gen I/P	
17	Open to Grnd to start	AMF Panel	Test Start Gen I/P	
18	Common to Ground	local	Ground	
19	Common to Ground	local	Ground	
20	Common to Ground	local	Ground	
21	Fuel Sensor Ground	Fuel Sensor 1		
22	Fuel Sensor Signal	Fuel Sensor 1		
23	Fuel Sensor +ve Power	Fuel Sensor 1		
24	12 volt power +ve	Generator battery	+ve (via fuse)	
25	12 volt power –ve ground	Generator battery	-ve	
26	Fuel Sensor Ground	Fuel Sensor 2		
27	Fuel Sensor Signal	Fuel Sensor 2		
28	Fuel Sensor +ve Power	Fuel Sensor 2		

15. Overview of site installation Schedule – Generic specific

1. Determine best place to install the F400e unit, bearing in mind the following –

    a. Needs to be protected from weather – not outdoors

    b. Needs to be visible and reasonably accessible for maintenance purposes

    c. Will need cable runs to following –

        i. 12 / 24 volt power from Generator Starting battery(s)

        ii. CAT5 Ethernet to Site Router / Switch

        iii. 1-wire CAT5 to site 48 volt batteries to measure:

            1. Voltage

        iv. Signal cable (can use CAT5) to pick up Generator On Load from Interface Units or auxiliary contacts on ATS or Contactors

        v. Signal cable (can use CAT5) to pick up Alarms from Generator AMF Panel

        vi. Signal cable (can use CAT5) to control AMF Panel functions

Note that of all the wiring considerations, probably priority to consider would be the 1-wire CAT5 distance to the site 48 volt batteries.
Maximum length of this cable is preferably about 50 metres.

2. Install the F400e unit using the DIN rail mounting.

3. Install the CAT5 Ethernet cable from the site Switch / Router to the F400e

4. Run a +ve & -ve pair from the Generator 12 / 24 volt starting batteries to terminals 24 & 25 on the F400e. Note that this cable must have a 1 Amp inline fuse installed on the non-ground side and as near to the 12 / 24 volt power source as possible.

5. The F400e unit should now automatically power up, as it will use its power source from the Generator Batteries.

6. The IP Address and default gateway of the F400e unit can be set by using a lap-top and connecting the F400e unit directly using the Ethernet cable as a local IP connection. The required IP Addresses will need to be discussed with the Project Manager and provided by the installer.

7. When the correct IP addresses are set then the unit should be in communication with the Server and can have some basic testing performed remotely by the MastMinder engineer.

8. Run a 1-wire CAT5 cable from the F400e unit to the site 48 volt batteries. If possible it is preferred that this is Shielded CAT5 cable to reduce the possibility of interference if the cable is a long run. Note that this cable only uses pins 5, 4 & 2 of the cable and these are connected to terminals 1, 2 & 3 respectively at the F400 end. The 48 volt voltage sensor is connected on this 1-wire CAT5 cable using an RJ45 plug.

9. The F400e unit needs to know if the generator is running, also if it is on load. This is just a simple switch on or off down to Ground and can be supplied to the F400 using a Generator Interface Unit (see above for details).

10. Alternatively, a mix of using the Interface Unit voltage sensor to sense generator running and then using auxiliary contacts on the Automatic Transfer Switch or Contactor to signal Generator On Load. CAT5 cable may be used as signal cable to extend the distance from the F400 unit to the Transfer Switch or Contactors.

11. The F400e unit needs to pick up various alarms from the AMF Panel, such as Common Alarm, AUTO or Manual Mode, Emergency Stop switch etc. None of these are mandatory and we may well pick up different alarms at different sites. This is very much dependent on the type of AMF Panel installed on the generator and there are a large variety installed at the various sites. We have detailed technical manuals for most of the different types of AMF Panels and copies of these manuals will be provided to the installation team to identify where and how to make connections plus any configuration that may be necessary in the Panel to make the alarms visible. Each site needs to be determined on its own merits and will be discussed and planned with the MastMinder consultant prior to each installation.

12. The F400e unit needs to be able to send commands to the AMF Panel, such as Test Start generator, RESET Fault, Force AUTO Mode, RESET Maintenance Alarm, etc. None of these are mandatory and we may well not implement all options at all sites. This is very much dependent on the type of AMF Panel installed on the generator and there are a large variety installed at the various sites. We have detailed technical manuals for most of the different types of AMF Panels and copies of these manuals will be provided to the installation team to identify where and how to make connections plus any configuration that may be necessary in the Panel to make the alarms visible. Each site needs to be determined on its own merits and will be discussed and planned with the MastMinder consultant prior to each installation.

13. The site may be tested now by the MastMinder consultant and it is recommended that the installation team remain at the site until the testing is completed.

14. Note that the above is simply a guideline to understanding the required procedure. It is not expected that the installation of all sites can be accomplished with this guide only. It is intended that the MastMinder Consultant will be available at all times, either remotely or on-site, to assist with every detail.

15. All software and firmware configurations will be accomplished by the MastMinder Consultant either remotely or locally.

16. Appendix – How to terminate a CAT5 cable with an RJ45 plug

RJ-45 Plug

Pin 1

Clip is pointed away from you.

o O g B b G br BR
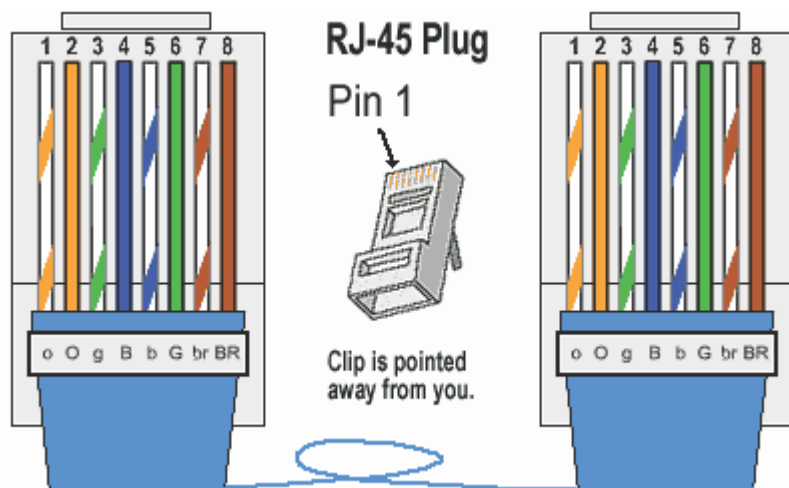
There are two kinds of Ethernet cables you can make, **Straight-Through** and **Crossover**.

STRAIGHT THROUGH Ethernet cables are the standard cable used for almost all purposes, and are often called "patch cables". It is highly recommended you duplicate the colour order as shown on the left. Note how the green pair is not side-by-side as are all the other pairs. This configuration allows for longer wire runs.

RJ-45 Plug

Pin 1

Clip is pointed away from you.

o O g B b G br BR

g G o B b O br BR
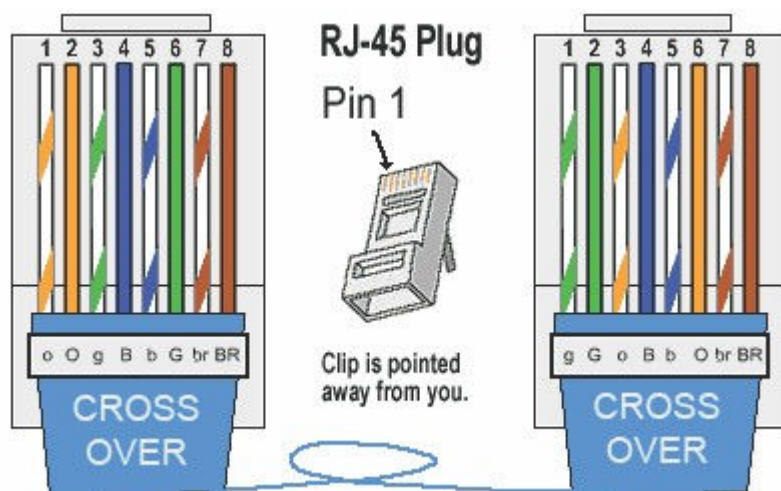
CROSS OVER

CROSSOVER CABLES - The purpose of a Crossover Ethernet cable is to directly connect one computer to another computer (or device) without going through a router, switch or hub.
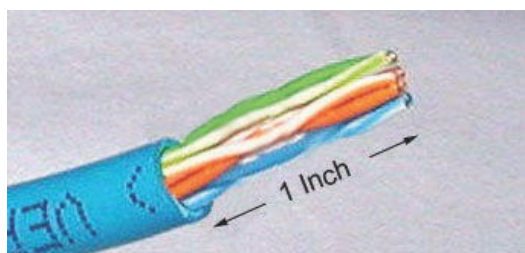
1 Inch

Here's how to make a standard cable:

Cut into the plastic sheath about **1 inch** (2.5 cm) from the end of the cut cable. The crimping tool has a razor blade that will do the trick with practice.
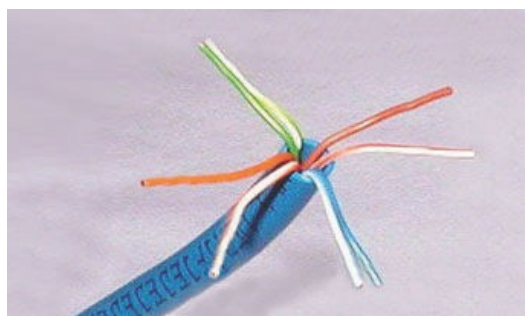
Unwind and pair the similar colours.
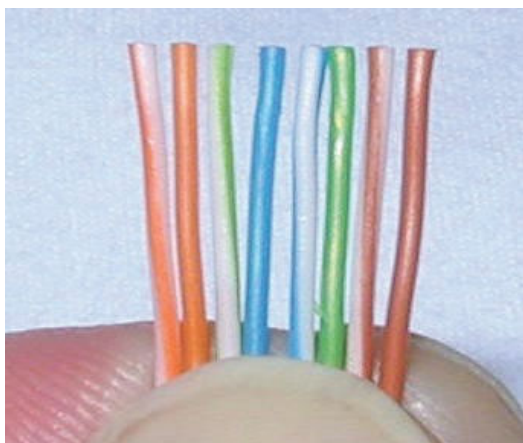
Pinch the wires between your fingers and straighten them out as shown. The colour order is important to get correct.

Use scissors to make a straight cut across the 8 wires to shorten them to **1/2 Inch** (1.3 cm) from the cut sleeve to the end of the wires.

Carefully push all 8 coloured wires into the connector. Note the position of the blue plastic sleeve. Also note how the wires go all the way to the end
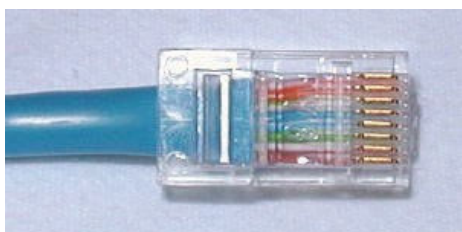
A view from the top.

All the wires are all the way in.

There are no short wires.
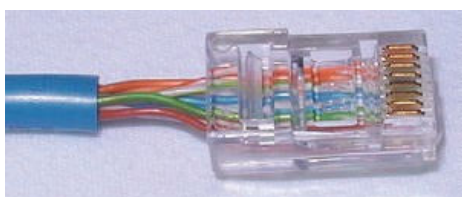
WRONG WAY - Note how the blue plastic sleeve is not inside the connector where it can be locked into place. The wires are too long. The wires should extend only 1/2 inch from the blue cut sleeve.

WRONG WAY - Note how the cables do not go all the way to the end of the connector.

CRIMPING THE CABLE ... carefully place the connector into the Ethernet Crimper and cinch down on the handles tightly. The copper splicing tabs on the connector will pierce into each of the eight wires. There is also a locking tab that holds the blue plastic sleeve in place for a tight compression fit. When you remove the cable from the crimper, that end is ready to use.

For a standard "Straight Through" cable, repeat all steps and wire colour order on the other end of cable. For a cross-over cable, the other end will have a different colour order as shown by the crossover picture above.

Make sure to test the cables before installing them. An in-expensive Ethernet cable tester does this quite well.

NOTE - The maximum cable length of CAT-5, CAT-5e or CAT-6 Ethernet cable is 328 feet or 100 metres.

Note also that for the CAT5 cable used for the 1-wire communication then only pins 2, 4 & 5 are connected to the F400 unit at Terminals 3, 2 & 1 respectively.

17. Appendix – How to set the IP Address in the F400 unit

The F400 unit is shipped with an IP address of 192.168.0.100 which is fine for most networks operating in a sub-net of 192.168.0.nnn.
If your network is in the range 192.168.0.nnn then you need to do nothing and you can address the F400 via its web interface by entering 192.168.0.100 in any browser connected to the F400.

However, if your network is different, for example, 10.0.0.nnn, then you will need to follow the procedure below to set the IP Address of the unit.

Firstly you need to know what IP Address you want to set it to, it will need to be an unused IP Address in the sub-net you intend to use it in.
In the above 10.0.0.nnn network you may choose to use 10.0.0.200 for example.

What we are about to do is to set up a simple direct local network solely between a PC or lap-top and the F400, we will need a short length of IP Ethernet cable, either cross-over type or direct should be ok as the F400 should self-detect the cable type.

Note that during this procedure the PC or lap-top will lose communication with the Internet and the local area network.

Step 1.

If the PC or lap-top is presently using an IP Ethernet cable then unplug it and replace it with a similar cable connected to the F400 Ethernet Port.
If the PC or lap-top is presently using wi-fi then simply connect the F400 to the PC or lap-top using the IP Ethernet cable.
Ensure the F400 unit is powered up via an inline 1 Amp fuse, using a DC supply in the range 6 to 30 volts.
The Green power light should be on and the red status light should give a double flash every 10 seconds.

Step 2.

We will now temporarily change the IP Address of the PC or lap-top.
This means it will no longer be able to communicate on the existing wi-fi or Internet, however it should enable it to communicate with the F400.
On the PC or lap-top, proceed to "Network Connections" by right-clicking on Windows 10 Start button.
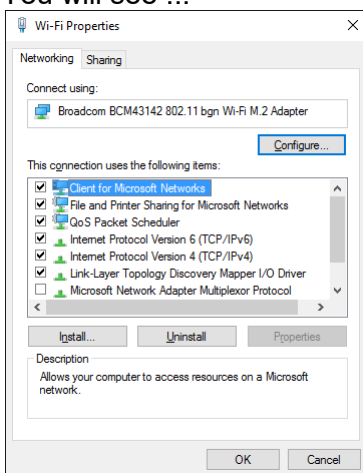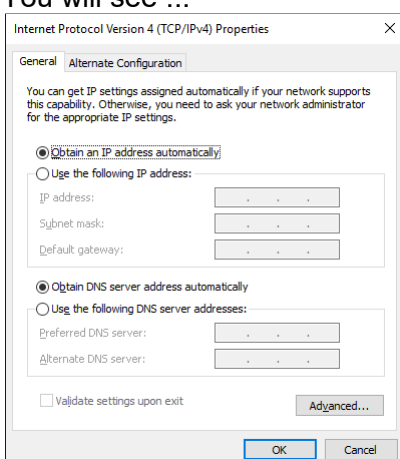
You will see ...
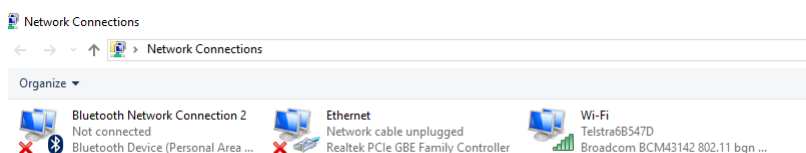
Double-click the active network, in this case "Wi-Fi".
You will see ...
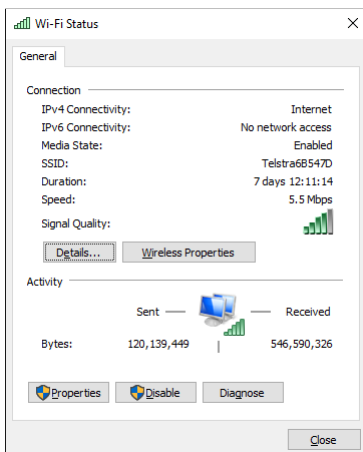
Press "Properties".
You will see ...

Double-click "Internet Protocol Version 4(TCP/IPv4)"
You will see ...

Ok, this is where we actually change the address of the PC or lap-top to a new fixed address instead of its presently allocated dynamic address.
(When we have finished we will change it back to the original setting).
Change the top radio button, as per below to now select "Use the following IP address" and enter the IP Address 192.168.0.200

Press OK
Press OK again on the following window
Followed finally by Close on the last open window.
This machine now cannot communicate with the wi-fi or Internet but should be able to communicate with the F400.

To communicate with the F400.

Enter http://192.168.0.100/
In any browser and it should bring up the F400 Web interface, looking like below.

Then modify as per below.

1. Enter a new IP Address of 10.0.0.200 as per our example above.
1. (to replace the 192.168.0.2 showing below).

2. Then press the submit button.
3. If the page does not refresh properly by itself the press the MastMinder logo in the top left hand corner of the window to refresh the page.
2. (You may press this refresh button as many times as needed).

4. If for some reason the new entry is not showing correctly then repeat lines 1 to 3 above as many times as necessary until the new IP Address shows in the page after a refresh.

The F400 unit now has an IP Address stored that will be compatible with the 10.0.0.nnn network as per our example.
The F400 and the cable may now be disconnected and any other IP Ethernet cable that was previously being used may be re-connected.

The PC or lap-top now needs to have its IP Address re-configured to use Dynamic Allocation rather than the IP Address we gave it earlier.

To do this, re-follow the original instructions above except this time reset the radio button to its original setting of "Obtain an IP Address Automatically" and the IP address we entered earlier will grey out and no longer be effective.

Press Ok, then OK again, then Close.

The PC or lap-top should now be back to normal and able to communicate with the wi-fi and Internet as before.